

Chemical Week

September 22, 1956

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Report--

The \$245-million
synthetic colors industry
gears to meet
new demands of a
color-hungry public
.... p. 47

When are lobbying costs tax-deductible? Here's the latest Washington thinking p. 21

Fluorine weds silicon, begets new breed of temperature- and solvent-resistant elastomers . . p. 38

Target: process to extract the profits from growing nuclear fuel scrap heap p. 72

Argentina's infant petrochemical industry—its growth demands plenty of government nursing p. 84

Drugmakers are on FDA's griddle. Sore point: new-drug introduction practices p. 100



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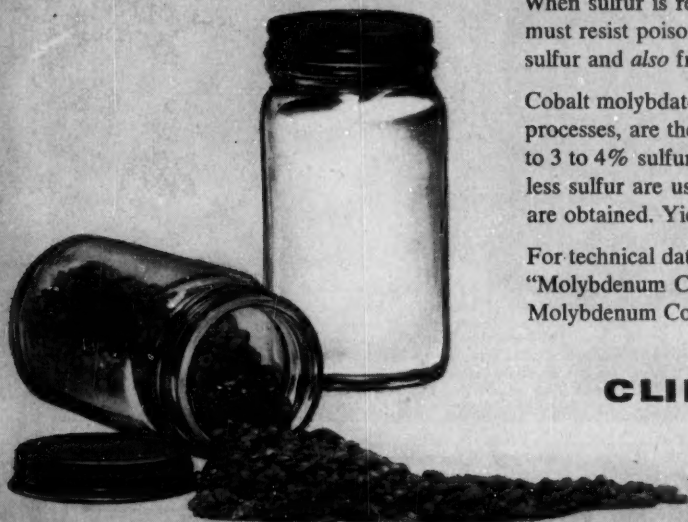
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Chemical Week

TOP OF THE WEEK

September 22, 1956

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Vol. 79

No. 12

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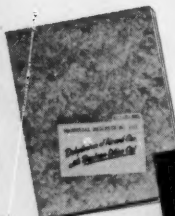
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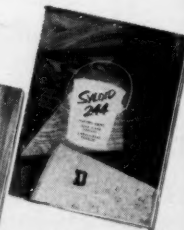
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September 22, 1956

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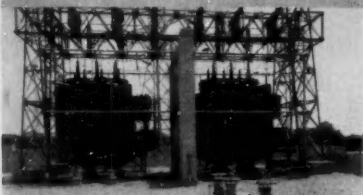




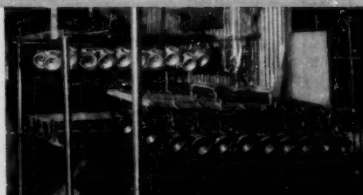
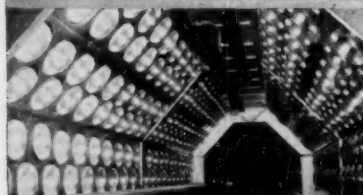
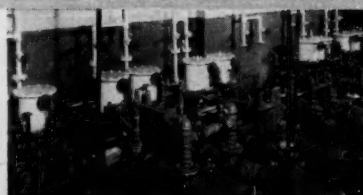
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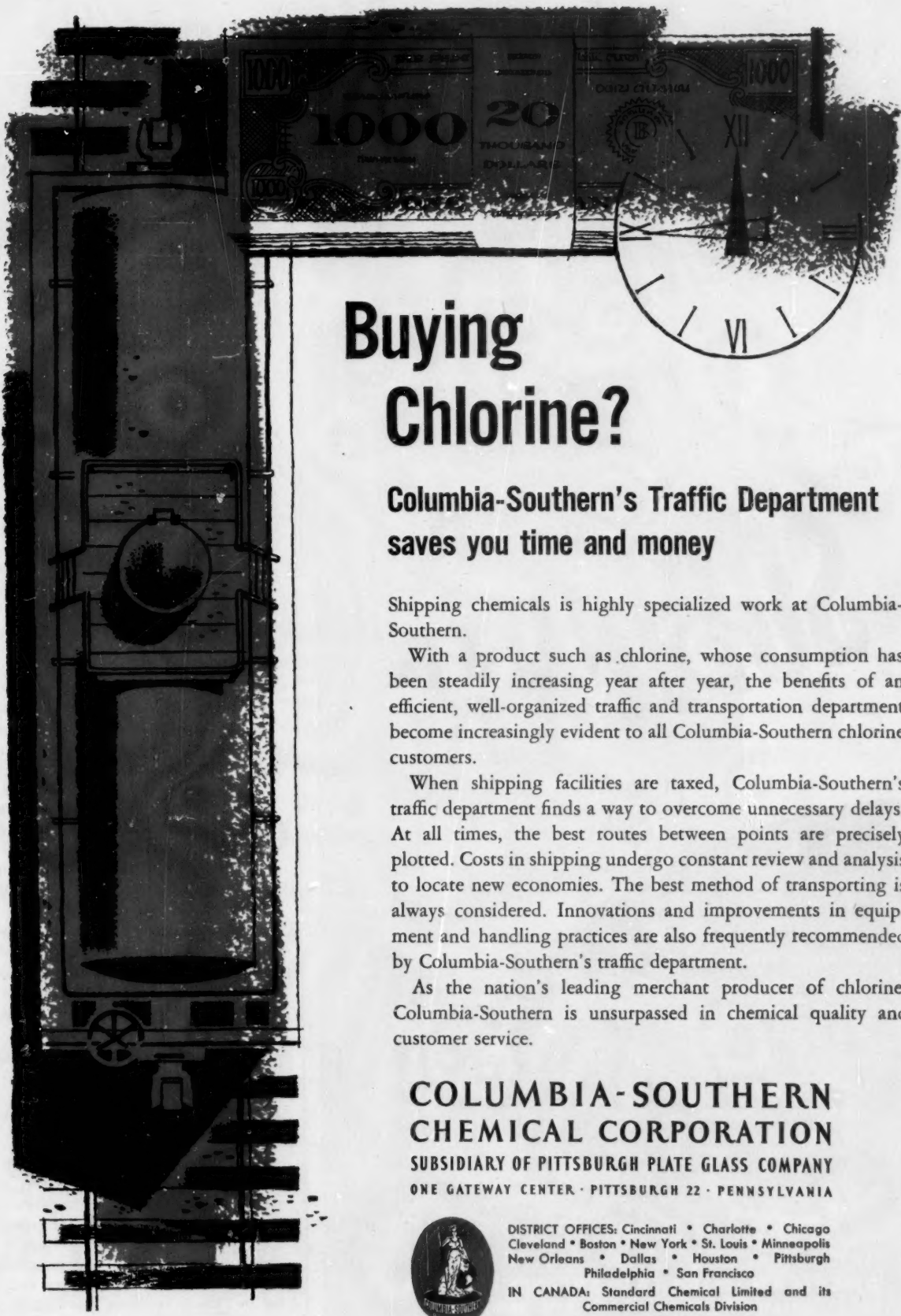
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OPINION

The Common Bond

One hundred years ago, William Henry Perkin failed to synthesize quinine. Had he been a sensible, matter-of-fact 18-year-old student, he would have thrown out the dark "gunk" resulting from his experiment and started afresh. But instead he explored his "failure," delved into it for whatever was of worth, and learned that he had synthesized the first coal-tar dyestuff.

It is not especially important that Perkin accomplished this 100 years ago, rather than 99 or 101. A centennial is an artificial device—albeit a useful one, since it is a commonly accepted juncture at which to pause, reflect on the past, and consider what perspective we have gained.

It is satisfying to savor the progress of the dyestuffs industry, reviewed in this issue (p. 47 ff.); it has gained remarkably over the past century both in scientific understanding and commercial stature.

Makers of dyestuffs and pigments today are a force that is working a revolution in our living standards and in our economy. As the Perkin Centennial registrants were told, color—whether on textiles or telephones, automobiles or beer cans—is a powerful catalyst of consumption. Hence, dyes and pigments are a far more fundamental factor in our economy than was imaginable a few short years ago—a fact underscored by the great diversity of groups that participated in the centennial celebration. Color is their common bond.

The celebrants spent very little time looking backwards over a century of history. As it should be, they looked ahead for ways in which to use color more effectively—and more profitably—in the years to come.

Howard C. E. Johnson,
Editor.

'F-T' a Trademark

TO THE EDITOR: We here at Dura Commodities Corp. thought it was a really fine idea that you published such a detailed article about the growing importance of the Fischer-Tropsch waxes (Aug. 25). We find that the article is extremely well written and, on the whole, presents an accurate picture to the chemical world as to the



1. Block of vinyl foam by Crest Chemical Industries Corp., Brooklyn, N. Y. 2. Thin sheet sliced from block is heat-sealable; can be sandwiched between fabrics to provide quilted effect. 3. Fish-net floats, by Linen Thread Co., Paterson, N. J. 4. Solenoid valve shield, by U. S. Rubber Co., Ft. Wayne, Ind. 5. Semi-rigid foam soles, by Foam King, Inc., Bronx, N. Y.

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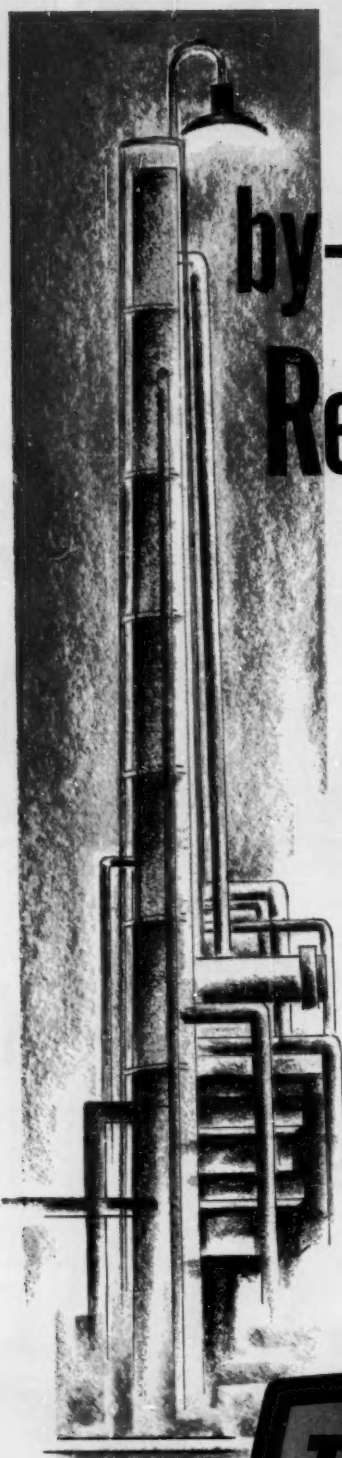
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OPINION

progress that has been made since the introduction of these synthetic mineral waxes in 1953.

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This is definitely not the case. The term "F-T" is a trademark, registered under No. 631596 at the U.S. Patent Office, by Dura Commodities Corp. It can, therefore, be used only in connection with mineral waxes sold by this corporation. . . .

I. Y. STRAUS
President

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New York

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American Society of Mechanical Engineers, petroleum division, Hilton-Statler Hotel, Dallas, Sept. 23-26.

American Rocket Society, fall meeting, sessions on propellents, combustion, telemetering, Hotel Statler, Buffalo, Sept. 24-26.

Materials Handling Institute, fall meeting, The Greenbrier, White Sulphur Springs, W. Va., Sept. 24-26.

American Oil Chemists' Society, 30th fall meeting, Chicago, Sept. 24-26.

Trade Fair of the Atomic Industry, Navy Pier, Chicago, Sept. 24-28.

Chemical Market Research Assn., Chateau Frontenac Hotel, Quebec City, Que., Sept. 26-28.

American Assn. of Textile Chemists and Colorists, Abraham Lincoln Hotel, Reading, Pa., Sept. 28.

Drug, Chemical & Allied Trades Section of the N.Y. Board of Trade, 66th annual meeting, Pocono Manor, Pa., Sept. 28.

Electrochemical Society, Inc., Statler Hotel, Cleveland, Sept. 30-Oct. 4.

European Federation of Chemical Engineering, annual meeting of process engineers, Hamburg, Germany, Oct. 1-3.

Technical Assn. of the Pulp & Paper Industry, 11th plastics-paper conference, at Institute of Paper Chemistry, Appleton, Wis., Oct. 3-4.

American Council of Independent Laboratories, 29th meeting, Savoy Plaza, New York, Oct. 28-Nov. 1.

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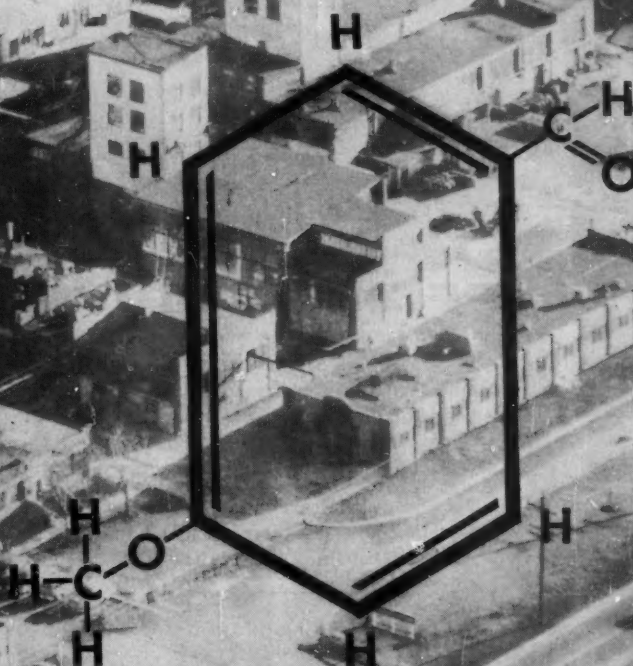
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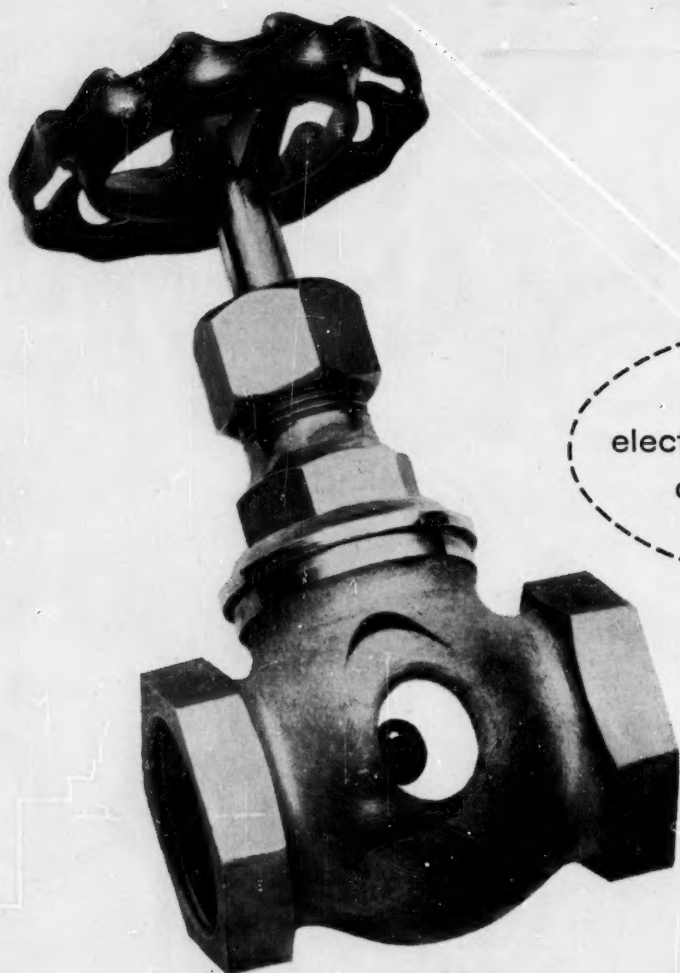
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Chlorobromomethane "CB". A specially prepared pure, noncorrosive fire extinguishing fluid. Now finding increased use in factories, warehouses, homes. Clear, colorless, 2 degrees C. boiling range; complies with current military specifications. Used as solvent and in organic synthesis.

Cyclopentyl Bromide. A clear, colorless liquid with an aromatic odor. Specially prepared for use in organic synthesis, particularly for introduction of the cyclopentyl radical. Many potential uses in manufacture of pharmaceuticals. Purified grade, 2 degrees C. boiling range.

1, 3-Dibromo-5, 5-dimethylhydantoin. $C_5H_8BrO_2N_2$. A bromine carrier and oxidizing agent. Useful in synthesis for side chain bromination and bromination of allylic carbon atoms. A fine stable powder with a minimum active bromine content of 54%.

β -Diethylaminoethyl Chloride Hydrochloride. $(CH_3CH_2)_2NCH_2CH_2Cl \cdot HCl$ (DEC). A granular solid. Specially suited for use as an intermediate in organic chemical manufacture, including antispasmodic agents and other pharmaceuticals.

β -Dimethylaminoethyl Chloride Hydrochloride. (DMC). $(CH_3)_2NCH_2CH_2Cl \cdot HCl$. A granular solid. Specially prepared for use in manufacture of antihistaminics and other pharmaceuticals. Other potential uses in organic synthesis. Relatively nontoxic in hydrochloride form.

β -Dimethylaminoisopropyl Chloride Hydrochloride. $(CH_3)_2NCH(CH_3)CH_2Cl \cdot HCl$ (DMIC). An organic intermediate similar

in appearance and properties to DEC and DMC. Specially prepared for manufacture of analgesics and other pharmaceuticals. Other potential uses in organic synthesis.

γ -Diethylaminopropyl Chloride Hydrochloride. $(C_2H_5)_2NCH_2CH_2CH_2Cl \cdot HCl$ (DEPC). A light tan to white crystalline hygroscopic solid. Used in pharmaceutical manufacture, especially for introduction of the diethylaminopropyl radical.

γ -Dimethylaminopropyl Chloride Hydrochloride. $(CH_3)_2NCH_2CH_2CH_2Cl \cdot HCl$ (DMPC). A white powder of singular purity. A versatile intermediate for pharmaceutical and organic syntheses, available exclusively from Michigan Chemical.

Ethyl Bromide. A clear, colorless, volatile liquid, specially prepared for use as an intermediate in organic synthesis. Practically free from impurities; has a narrow boiling range. Used in manufacture of dyes, perfumes and pharmaceuticals.

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they both had a big night

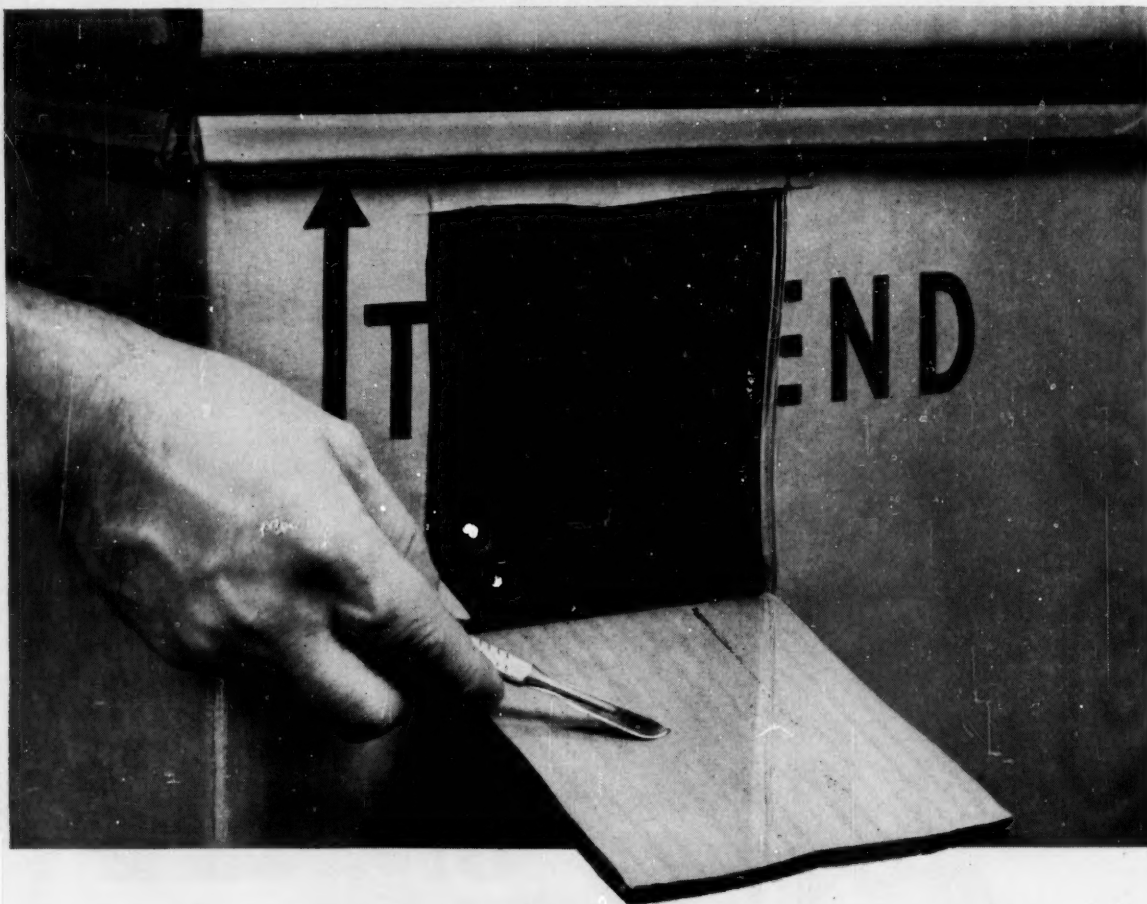
She and her classroom. She painted the town pink last night. And now, back with her class this morning, she finds the room had a big night, too. Painters were in. The whole room is painted, bright and clean to match the scrubbed faces and bright spirits of her youngsters.

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Business Newsletter

CHEMICAL WEEK
September 22, 1956

Spencer Chemical will enter a second major plastics field. It will construct a plant at Henderson, Ky., to make nylon-6 molding compounds, using technical know-how from the Dutch firm AKU (Algemene Kunstzjde Unie). The plant, which will cost somewhat under \$2 million, will be completed in about a year. Spencer, like Foster Grant (*CW Business Newsletter*, June 16), will buy its caprolactam monomer from Allied Chemical.

Spencer will give special attention to nylon extrusions—a field it feels has not been fully exploited in this country.

Also on the new plant front—a capacity boost for titanium dioxide, a contraction of plans for a pulp mill, and hopes for still another mill. American Cyanamid will double the current 36,000-tons/year capacity of its \$15-million Savannah, Ga., titanium dioxide pigment plant. The new facilities should be running by early '58.

But Bowaters Southern Paper Corp. has had to revise plans for its pulp and paper plant near Rock Hill, S. C. It won't be producing the 1,200 tons/day of pulp it originally planned. Reason: current figures show that riverflow in the Catawba River is less than previously estimated.

Meanwhile, it's getting more likely that a pulp mill or two will be located in Louisiana's Rapides or Grant parish. There's been considerable industry interest in establishing such a mill, but lack of water has hampered negotiations. Now the situation may be remedied if state voters, on Nov. 6, approve a constitutional amendment that would set up the Iatt Lake water conservation district in the two parishes.

Thirteen large Niagara Falls users of power—most of them electrochemical process firms—have set up the Basic Industries Power Committee to obtain "livable" power rates from Niagara Mohawk Power Corp.

The firms, which had been paying three mills per kilowatt hour for much of their power before Niagara Mohawk's Schoellkopf power station was gutted by a rockslide, are now paying up to seven mills for power, much of which is being imported. Niagara Mohawk has indicated (*CW*, Sept. 1, p. 23) that it will ask a permanent "adjustment" for industrial power rates. The industrial firms consider four to five mills a "livable" rate.

What would a higher rate mean to the companies? Where 81 of 226 Niagara-area plants surveyed before the rockslide said they planned expansions or additions of new equipment, there's some question whether the ratio would be that high today—especially among firms to whom power costs are a substantial part of doing business.

Business Newsletter

(Continued)

Another big cost of doing business—wages—are rising in West Virginia. Carbide and Carbon Chemicals boosted the pay of its 5,600 workers at South Charleston and Institute by 4%, as did Du Pont for its 2,700 employees at Belle. Monsanto, which has a contract with Mine Workers' District 50, granted its 450 workers at Nitro a 12¢/hour wage hike this year, plus 8¢ in Oct. '57.

The soap industry antitrust suit has been dismissed, as expected, due to the refusal of government attorneys to turn over, as ordered, certain grand jury minutes to the defendants—Colgate-Palmolive, Procter & Gamble, Lever Bros. and the Assn. of American Soap & Glycerine Mfrs. The minutes were those of a grand jury, convened to investigate an alleged soap industry monopoly, which refused to indict the companies.

The government will now appeal the dismissal directly to the Supreme Court—which can either rule on the question or send the appeal to the Third Circuit Court of Appeals in Philadelphia for an intermediate ruling.

Oyster growers' pollution fears may involve a synthetic fiber plant. Growers along Virginia's James River urged at a state water board hearing that Dow Chemical not be allowed to dispose of the 11 lbs./day of zinc carbonate wastes from its prospective fiber plant into the river until studies have been made to assure that the chemical is harmless to oysters.

Eli Lilly's Canadian subsidiary wants to import Salk polio vaccine from the U. S., and has applied for permission to Canadian authorities. Connaught Laboratories there has been able to meet demands of the government's own supply program only, has sold none for general use.

Should expenses promoting oil conservation be tax deductible? Or should they be considered political and nondeductible expenses? Though unlike the cases aired by a Senate committee last week (*sec p. 21*), because it involves state law, there's a real question whether Richfield and the other California oil firms will be able to deduct all the cost of getting a conservation-promoting provision on the state's election ballot this November. While Richfield reports that the Internal Revenue Service has not challenged its tax reports, it admits that there are conferences going on to determine what part of its expenditure—once estimated at "between \$1 million and \$2 million"—can be considered an educational effort (and thus be deductible), and what is a political expense, which can't be subtracted for tax purposes from the company's pre-tax income.

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






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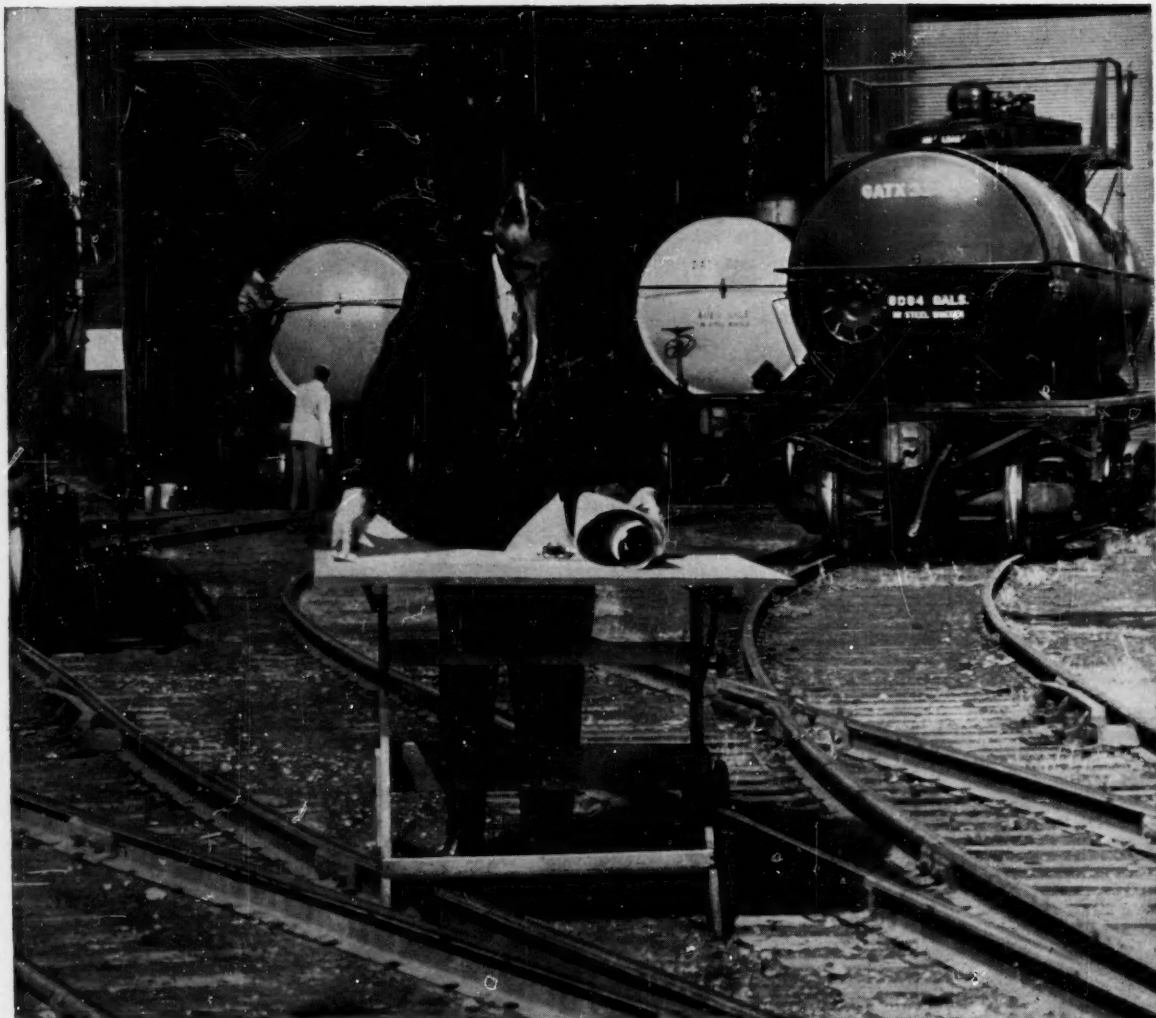
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WIDE WORLD

Hard Decisions in a Muddy Area

The problems faced last week by Gulf Oil's Board Chairman Sidney Swensrud (*above right*) and its general counsel, Archie Gray, were an executive's nightmare. They had been called up before a special Senate committee to explain their corporation's contributions to organizations set up to educate the public and, perhaps, members of Congress on the natural gas industry.

Crux of their problem: Justifying, in black-and-white terms, Gulf's decisions on which of its expenditures are tax-deductible business costs, which are nondeductible costs of lobbying—a difference that must often be painted in hardly differing shades of gray.

Though the subject with which these hearings were concerned—the degree of federal control over the natural gas industry—is of specific interest only to certain segments of the chem-

ical process industries, the hearings focus attention on a broad problem that faces many businessmen:

When are dues or contributions paid to a business or industry organization deductible from a corporation's federal tax return?

And whatever a businessman's decision, it will be subject to review—if not by Congress, at least by the Internal Revenue Service. IRS rules bar tax deductions for campaign contributions, direct attempts to influence legislation, and "development and exploitation of propaganda (including advertising other than trade advertising)." Dues or contributions to organizations with such as primary aims are also nondeductible.

But on the other hand, funds paid to a trade or business group that promotes "a common economic interest"

are deductible "even though influencing or attempts to influence legislation" is an "incidental" function.

Betwixt and Between: Obviously, there will often be only a fine line between deductible and nondeductible contributions. Tough interpretations by IRS—which considers each case separately—could make life hard for a lot of trade associations, and cast a shadow over a lot of public relations and advertising activities that bear on issues before Congress.

The current hearings show some of the distinctions. Where most oil firms considered contributions to the General Gas Committee as nondeductible expenses—despite a contention that the group did no lobbying—all deducted payments to the Natural Gas and Oil Resources Committee.

To one official, Sen. Clinton Ander-

son (D., N.M.) commented: "In other words, the U.S. Treasury footed 52% of the bill for this [NGORC] campaign."

Senate Proposal: The Senate group is expected to press for tougher regulations when Congress reconvenes in January—both by requiring more people to register as lobbyists, and by changing tax laws to make it clear that money spent for propaganda in-

tended to influence legislation is not a deductible expense.

Conceivably, such legislation could make business reluctant to give future support to groups interested in such vital chemical issues as tariffs, chemical food additives, pollution control. Too, the current furor may spur a new crackdown by IRS on such past and current expenditures by chemical businessmen.

run less than 25% of the chemical total, a marked decrease from the earlier internal sales rate of 50%.

Sounder Days: Whether Celanese will be able to realize its goals for 1960, the end of its current 5-year plan, remains to be seen. Some analysts wonder whether the \$100-million capital outlay is within the company's means.

Nonetheless, the recovery Celanese has shown since the bleak years of '52-'54 indicates a hard-working program to beat the dependence on textiles. If the company can increase its share in the chemical and plastics markets as it hopes to, sounder days are certainly ahead.

Emphasis Shift for Profits

Celanese Corp.'s continuing push away from dependence on the vicissitudes of the textile market will hike its total sales some 70% by 1960, Celanese President Harold Blancke predicted last week.

Forecasting a better-than-\$300-million sales volume by then, Blancke told a group of New York security analysts that his company will spend on its chemical and plastics divisions virtually all of the \$100 million it has allocated for the next four years' expansion. In the textile division, on the other hand, Celanese will primarily be trying to bring operations up to 100% capacity.

This tremendous emphasis on the nontextile operations of the company should more than double the contribution made by chemicals and plastics to total sales. Reliable unofficial estimates put current chemical and

plastics divisions' sales at about 30% of the company's total sales—about \$53 million of 1955's \$177.5 million total.

Add to this Blancke's forecast that the new investment will generate \$125 million/year in new sales by 1960 and it's quite probable that chemical and plastic sales will top \$178 million or about 60% of the firm's anticipated total sales in 1960. This whopping increase in five years contrasts with the growth to 30% effected in the over-a-decade period since the company started concentrating on these two growth lines.

Rosier Times? Despite the widening diversification of its operations, the picture for Celanese is not altogether rosy. Some Wall Streeters have looked askance at the corporation's top-heavy financial structure. In 1955, for example, the company's funded debt totaled \$93 million, on which it had to pay \$3.2 million yearly interest besides being required to retire better than \$2 million annually, a total of more than \$5.2 million/year. And these figures, in the light of the company's net operating income—\$21.5 million for '55—add up to the need for a pretty conservative approach to new financing during the next few years.

The company's dependence on textiles put it in bad shape during 1952-54, when earnings didn't even match dividends. (Even now, its 4½% preferred, callable at 105, is selling around 65; common and 7% preferred are down considerably from the year's high marks.)

Yet, Blancke reports, plastics sales are running some 10% above the 1955 level, and chemical sales have shown continual increases since 1950. Too, chemical sales this year to other company divisions are expected to

In for Independents

Independent oil companies have won the right to be represented at hearings to determine if stock of Universal Oil Products Co. may be sold. That's the upshot of a decision just handed down by Judge Jacob Markowitz.

Attorneys for seven independent refiners and two trade organizations presented arguments contending the sale would threaten a small firm's ability to compete in the industry by cutting off research services now available to them through UOP (*CW Business Newsletter*, Sept. 15). UOP's stock is the main asset of the Petroleum Research Fund, a trust managed by Guaranty Trust. Guaranty Trust estimates its worth at \$50 million.

Judge Markowitz said in his decision that small refiners were "so situated as to be adversely and vitally affected" by possible sale of the stock.

Now hearings will get under way before William J. O'Shea, a New York attorney appointed as referee. He'll rule on whether UOP can be sold, and fix what he considers a fair commission to Guaranty Trust for handling the sale. Markowitz will make the final ruling after examining O'Shea's report.

Filtrol Corp., which has filed two petitions asking that Guaranty be ousted as executor of the sale and that sale terms be changed (*CW Aug. 25*, p. 20), was not represented at the hearings. In fact, Filtrol says it hasn't even hired a lawyer. Judge Markowitz indicated that he would treat the Filtrol petitions as a separate application, not a petition to intervene in the case.



WIDE WORLD

CELANESE'S BLANCKE: By 1960, chemical-plastic sales of 60%.

Financial Boost For Bromine Push

Michigan Chemical Corp.'s unrelenting drive to make itself a major factor in bromine received added impetus last week when Pennroad Corp., Websters Investors, Inc., and American Mfg. Co. agreed to buy 150,000 shares of unissued Michigan common stock. At current market prices, this would provide the firm with about \$2.7 million.

Contractually, the deal depends on "Michigan's capital requirements for future expansion." In explanation, one of the investors says that the three buyers will purchase the stock if Michigan gets a certain sales contract, which hasn't yet been signed, though it appears imminent.

Says Michigan President Theodore Marvin: "We're contemplating added efforts in both brine chemicals and the rare earths, and in the case of the former we're definitely considering additional plant construction."

The company is now working at El Dorado, Ark., with the Murphy Corp. on a project to recover bromine from oil-well brine. As to future plans on rare earths, Marvin says, "We don't want to discuss it."

How Big a Slice? If the stock-buying deal goes through, it would make the three investment companies substantial owners of Michigan Chemical. Release of 150,000 shares from treasury would make 687,077 shares outstanding, and give Pennroad, Websters and American some 22% of the stock. Websters and American are both controlled by Gurdon Wattles, who worked closely with Pennroad in negotiating the recent sale of Houston Oil Co.'s assets—primarily oil reserves—to Atlantic Refining.

Could this holding exercise control? Michigan discounts such a possibility, pointing to the fact Michigan director T. C. Davis and two other stockholders vote better than 300,000 shares of the company's stock.

There's been no word yet on whether the new buyers will supply any capital to Michigan, beyond the first \$2.7 million. But one thing's sure: the proposed stock sale would give a healthy financial boost to Michigan Chemical's search for new bromine production and markets.



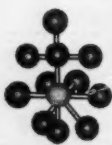
Moscow Capitalist Visits Midland

ON HAND to hear Dow Chemical President Lee Doan report at last Wednesday's annual meeting that the firm will spend \$75 million for new plants this year was a capitalist from Moscow, Constance

Stuck of the American embassy. The New York Stock Exchange says that Miss Stuck bought the millionth share of stock—a Dow share—to be purchased under its monthly investment plan.



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» **Chemical plant expansion** is expected to amount to \$853 million in the second half of 1956. That's almost a third more than the industry spent for new plant and equipment in the first six months. The total for the year, \$1.5 billion, will set a new record.

But there may be some delay in getting the scheduled expansion into place. The government reports that expenditures for plant and equipment in all industries are now running slightly under what industry expected to be spending.

Strike-induced steel shortages are blamed for some of the delay; but perhaps some original expansion goals were unrealistically high.

» **About 40% of the money and manpower** devoted to U.S. research and development go to military projects, Pentagon R&D chief Clifford C. Furnas, told the American Institute of Chemical Engineers last week. Total R&D costs, he said, amount to about \$5 billion yearly, about 1% of the U.S. gross national product; an extra 2% of the GNP is spent "adapting" these research results.

» **The government will soon make another try** at leasing, for 5-15 years, its 90,000 tons/year alcohol butadiene plant at Louisville, Ky. The Rubber Disposal Commission plans to advertise for bids for lease before it goes out of business Sept. 23. Bidders, who will be asked to make offers by Oct. 15, will deal with the Federal Facilities Corp., which takes over the commission's leasing authority.

FFC will insist on a national security clause. It plans to make such a lease effective after April 4, '58, when Publicker Industries' present 3-year lease runs out.

Congress will have to okay any long-term lease negotiated by FFC. As a result, the offer to lease the plant won't rule out Congressional revival of the once-aborted move to sell the plant.

» **No solution came** out of last week's meeting of Food & Drug Administration officials, industry, and farm and medical experts. Under discussion: penicillin residues in marketed fluid milk. Little agreement was reached on the extent of the problem.

Some questioned FDA's evidence that many farmers are selling milk too soon after injecting cows with penicillin-containing mastitis remedies.

FDA will turn over a transcript of the meeting to a medical panel, which will evaluate the evidence and perhaps suggest a solution.

EXPANSION

Aromatic Chemicals: Ashland Oil & Refining Co. will build a 21-million gal./year aromatic chemicals addition to its refinery at Buffalo, N.Y. The unit will produce benzene, toluene, xylene and other petrochemicals. Construction will be completed by the end of 1957.

Aluminum Sulfate: Nichols Chemical Co. will build a 15,000-tons/year aluminum sulfate plant at Barnet, B. C., to serve western Canadian pulp

and paper needs. Construction will begin this year.

Alumina: Olin Revere Metals Corp. will build a \$54-million alumina plant on the west side of the Mississippi River at Burnside, La. Capacity: 350,000 tons/year. The plant is slated to start production in late 1958.

Caustic Potash: Dow Chemical Co. will triple its caustic potash production by expanding facilities at Pittsburg, Calif. To cost "in excess of \$1 mil-

lion," the new capacity will be completed early in 1957.

Mica: Mica and Minerals Corp. of America will build a \$300,000 mica processing plant in Hart County, Georgia.

Pulp and Paper: Hammermill Paper Co. has bought an 800-acre site near Franklin, Pa., on which it may construct a plant to produce pulp or paper, or both.

Aluminum: Reynolds Metals Co. will build an aluminum reduction plant on a 1,500-acre site at Massena, N.Y. Reported cost of the plant: \$100 million.

COMPANIES

Brush Beryllium Co. has registered 400,000 shares of common stock with the Securities & Exchange Commission; 375,000 will be offered publicly, the remainder to be offered to present stockholders. The \$3.75 million of proceeds will be used for expansion of beryllium facilities to meet contracts with the Atomic Energy Commission (*CW Business Newsletter*, Sept. 15).

General Tire & Rubber Co. has acquired 75% of the common stock and 40% of the preferred stock of A. M. Byers Co. The acquisition was made on an exchange of stock basis. Byers has recently broadened its metal-pipe line to include plastic products.

Hercules Cement Corp. will issue three new shares of \$1 par value common stock for each share of \$10 par common outstanding Oct. 1—thus reducing its outstanding common stock capitalization from \$3 million to \$1 million.

Fansteel Metallurgical Corp. will make a public offering of \$3 million of subordinated debentures due Oct. 1, 1976. Proceeds will be used for construction of tantalum-columbium facilities in Muskogee, Okla. (*CW*, Aug. 25, p. 22).

Procter & Gamble Co. has placed \$70 million worth of 3½% 25-year debentures on the public market. Sinking fund provisions allow for retirement of 90% of the issue by maturity. Part of the proceeds of the

sale will be used for construction of a \$40-million dissolving pulp mill at Foley, Fa.

Monsanto Chemical Co. has offered employees three-year options on 400,000 shares of common stock at \$38.50/share—about 95% of the current market value of the stock.

Washine Chemical Corp. is the new name of Washine National Sands, Inc. (Lodi, N.J.).

Polymer Corp. has placed a block of 41,300 shares of Class A common stock on the market at \$7.25/share. Some of the funds raised will be used to buy production and development equipment, as well as to reduce bank loans.

Clorox Chemical Co. stockholders will vote Sept. 25 on a proposal to increase the firm's authorized common stock from 750,000 shares to 1,050,000 shares of \$3.33½ par value.

Worth Chemical Products Co. will offer for public sale 275,000 shares of common stock at \$1 par value.

FOREIGN

Petrochemicals/England: Monsanto Chemicals Ltd. (London) will erect a 10,000-tons/year polyethylene unit at Fawley, scheduled for completion in 1958. This will be followed by facilities for large-scale production of copolymers of such monomers as acrylonitrile and butadiene. The company will then build a large plant to manufacture acrylonitrile. Total cost: \$23.8 million.

Polyvinyl Acetate/Spain: Farbwerke Hoechst (Germany) and Electro-Química de Flix (Barcelona) will put up a jointly owned 1,400-tons/year polyvinyl acetate plant at Flix. Units to produce acetaldehyde, acetic acid and anhydride will also be installed. Production is scheduled to start early in '57.

Phenol/Poland: Hajduki Chemical Coke Co. (Stalinogrod, Kattowice) is planning a new phenol plant to be engineered by West German technicians and installed by East German and Polish workers.



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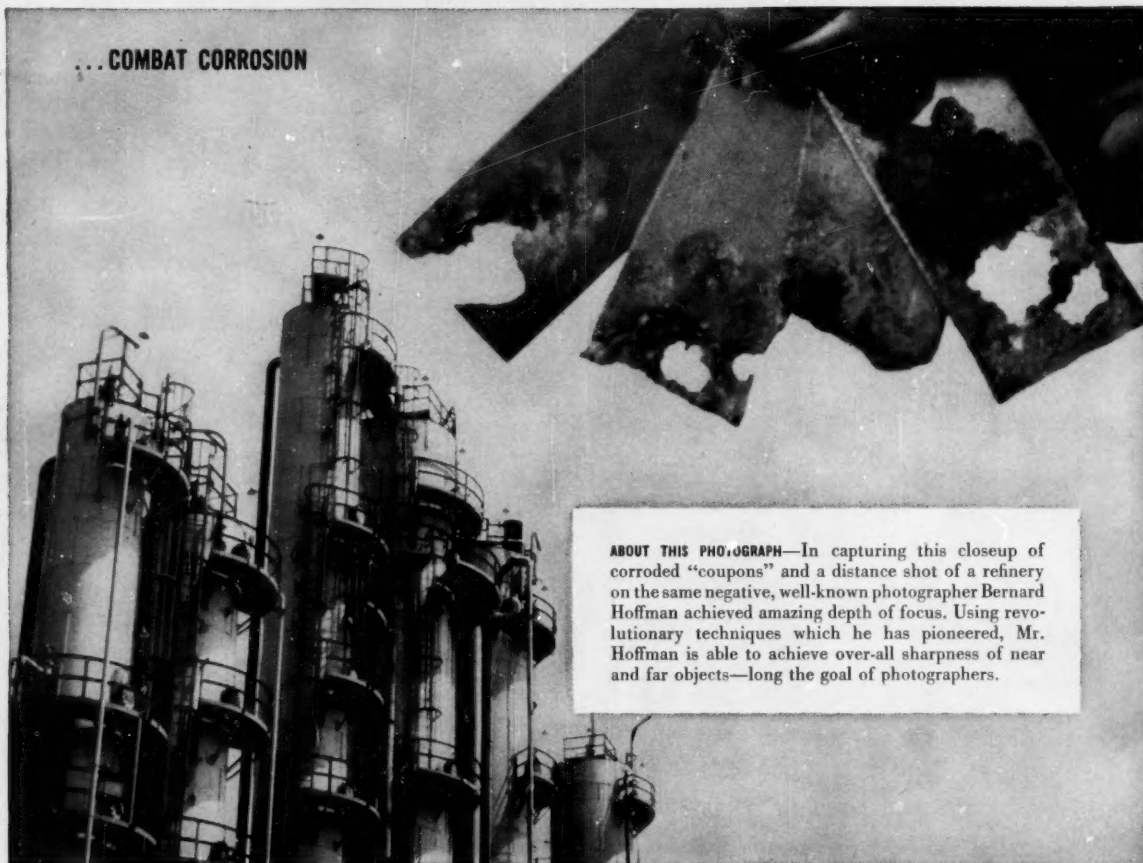
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...COMBAT CORROSION



ABOUT THIS PHOTOGRAPH—In capturing this closeup of corroded "coupons" and a distance shot of a refinery on the same negative, well-known photographer Bernard Hoffman achieved amazing depth of focus. Using revolutionary techniques which he has pioneered, Mr. Hoffman is able to achieve over-all sharpness of near and far objects—long the goal of photographers.

CORROSION COSTS MILLIONS every year for petroleum refiners. Metal losses as illustrated by these corroded coupons are the "danger signal" that corrosion is at work. Hercules Polyrad®, a corrosion inhibitor, prevents this damage. By forming a molecular film that protects the process side of refinery equipment from corrosive media, Polyrad drastically reduces "down time" for maintenance; cuts costly replacement bills.

ABLE TO WITHSTAND STERILIZING, this plastic baby bottle was molded from Hercules Hi-fax*, a new ethylene polymer. A completely new plastic, Hi-fax offers a combination of properties never before available, including four to five times the rigidity and twice the strength of conventional polyethylene. Hi-fax is now available for limited production runs.

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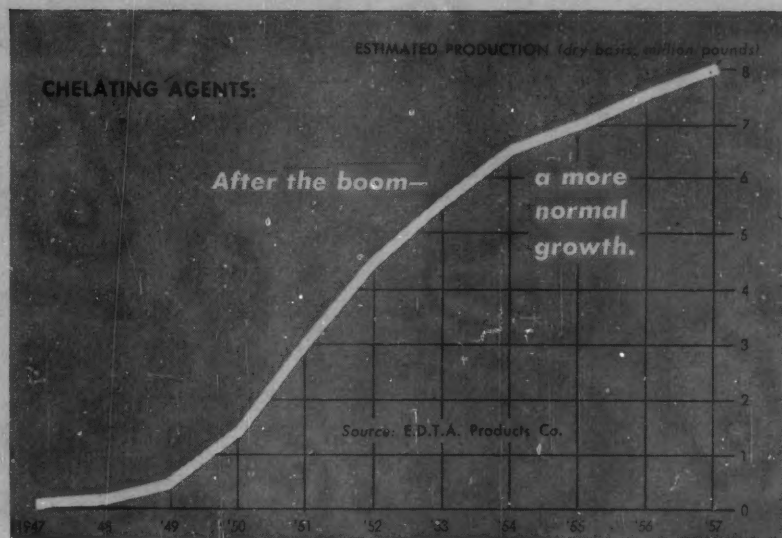


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Charting Business

CHEMICAL WEEK

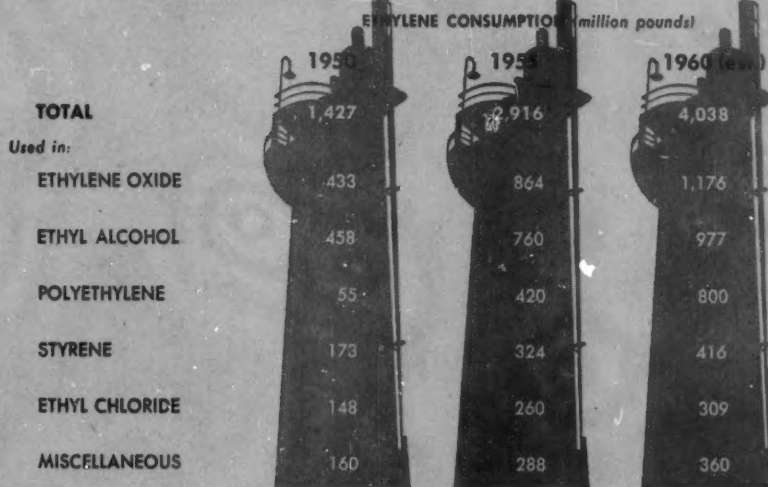
September 22, 1956



ALTHOUGH sales of chelating agents have skyrocketed in the last decade, production is now expected to climb at a more normal rate. Reason: saturation of the readily available market. What about today's market consumption? Soaps and

detergents use 30% of the total amount produced; textiles another 30%; agricultural needs, 20%; synthetic rubber, metal refining, pharmaceuticals and research take the rest. Markets to watch: increased use in agriculture, metal refining.

ETHYLENE—industry's building block for chemicals



Source: Petroleum Processing, McGraw Hill.

ETHYLENE'S consumption growth is expected to maintain its vigorous pace for at least the next five years. Forecast for 1960: a 38% increase over 1955. One major factor is the concurrent rise in plastics, especially polyethylene. Today, polyethylene is third largest con-

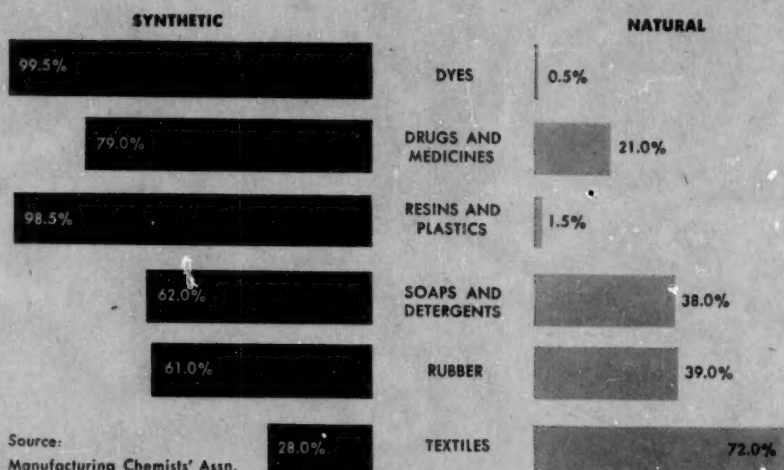
sumer of ethylene, takes 14% of the total produced; by 1960, it may use 20%. Ethylene oxide and ethyl alcohol are and will continue to be "big time" consumers, though percent of total ethylene consumed by styrene and ethyl chloride by 1960, on the other hand, may drop.

Charting Business

(Continued)

MAN-MADE PRODUCTS PUSH NATURE'S RAW MATERIALS

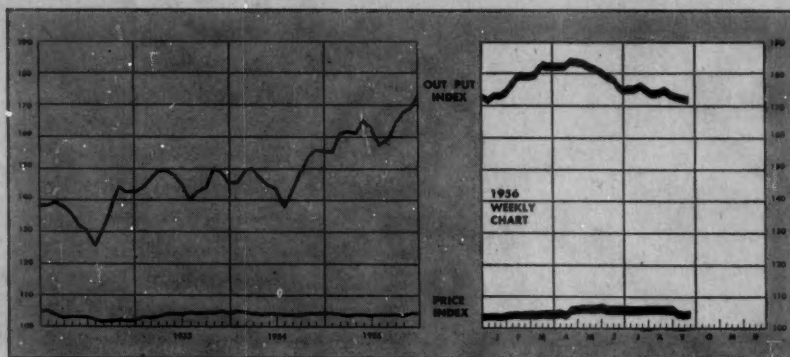
Percent of Total Production, 1955



Source:
Manufacturing Chemists' Assn.

TODAY, synthetic commodities are far more numerous than those made from so-called natural materials. This relatively recent development stems largely from greater technological progress in the synthetics and from resultant increased demand. An important exception to the predominance of synthetics

in chemical and allied industries is textiles. This industry still depends chiefly on natural products (wool, cotton, silk) for its basic materials. With the increased use of combined synthetic and natural yarns, however, man-made fibers will continue to make deeper inroads into the textile world.



WEEKLY BUSINESS INDICATORS

	Latest Week	Preceding Week	Year Ago
Chemical Week Output Index (1947-49=100)	173.5	172.7	164.2
Chemical Week Wholesale Price Index (1947=100)	105.4	105.8	104.3
Stock Price Index of 11 Chemical Companies (Standard & Poor's Corp.)	465.2	477.3	487.8

MONTHLY

Trade (million dollars)	Manufacturers' Sales			Manufacturers' Inventories		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
All manufacturing	26,118	27,665	26,731	49,108	49,090	43,938
Chemicals and allied products	1,966	2,028	1,844	3,554	3,512	3,039
Petroleum and coal products	2,484	2,552	2,299	3,017	2,953	2,753



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ADMINISTRATION

POSTWAR-KOREA BOOM IN BORROWING

Long-term debts of 16 major U.S. chemical companies***

	1951	1952	1953	1954	1955
Debentures	\$112,417,500	\$190,225,000	\$521,182,500	\$517,630,000	\$535,658,000
Promissory notes	262,607,142	546,917,428	637,983,714	719,531,000	704,945,000
Other contractual obligations	917,922	703,518	154,500	35,700	0
Total long-term debt*	375,942,564	737,845,946	1,159,320,714	1,237,196,700	1,240,603,000
Preferred stock outstanding	148,217,800	138,145,300	143,170,800	194,197,300	117,964,900

Chemical Companies Reduce Their Debts

The peak, it seems, has been reached in postwar-Korea borrowing by U.S. chemical companies.

With interest rates on the rise (*CW*, April 21, p. 18) and with more corporate income available for internal financing (*CW*, Sept. 1, p. 30), it now appears that the chemical concerns that have been using their excellent credit ratings during the past five years are whittling away at their debt loads. Prepayments are in fashion, and there's a definite trend toward retirement of preferred stock.

Among 16 major chemical companies (see table, above), there were no bond issues during the five-year period; and outstanding preferred stock was trimmed by more than 20%. Principal due on loans from banks and insurance companies dipped by 2.2% from 1954 to '55, but Monsanto's issue of an additional \$25 million in its 3.75% income debentures led to a 3.5% climb in the 16 firms' total on this kind of financing during 1955.

Few 'Clean Slates': Three of the companies in the survey group—American Agricultural Chemical, Hercules and Pfizer—stayed clear of long-term financing throughout the five years, though Pfizer did indulge in

some short-term bank loans. This year, American Ag accepted a \$12-million outlay from three insurance companies.

Atlas, Pennsalt and Victor each reduced their funded debt from 1951 to '55. Atlas has started making payments on a \$5-million loan, and in addition has retired all preferred stock. Pennsalt cut its notes-payable total from more than \$5 million to less than \$4 million, but then last April sold \$15 million worth of 25-year, 3.45% debentures.

The other 10 companies in this sampling all increased their funded indebtedness during the five years. However, in six cases the debt total has been dwindling for the past two years, and borrowing by the other four companies seems to have reached a virtual standstill.

Preferred Stock Waning: Five of the companies had no outstanding preferred stock during the five years: Allied, American Ag, Commercial Solvents, Pennsalt and Union Carbide. And last year, four other companies took preferred stock off their books. Atlas retired \$5.2 million, Dow \$30.4 million, Monsanto \$15 million and Victor \$8 million. Pfizer has been

shrinking its volume of preferred each year by amounts ranging from \$124,000 to \$350,000, but still has nearly \$19 million outstanding.

Cyanamid reduced its Series B preferred stock from \$15.5 million outstanding in 1951 to only \$3.4 million in '54; but during the latter year the company sold a \$58-million Series C issue, thus accounting for the 1954 bulge in the 16-company preferred stock total. Cyanamid then retired nearly \$15 million worth of preferred during '55. Hooker—which has had a \$5-million preferred stock issue outstanding since 1944—sold a \$9.7-million secondary issue in '53, then retired it on the last day of '54.

The four other companies in the group stood pat on their preferred stock throughout the five years: Diamond Alkali at \$12 million, Hercules at \$9.6 million, IM&CC at \$9.8 million, and Rohm & Haas at \$6.2 million.

What prompted chemical companies' recent borrowing was eagerness to seize new growth opportunities. With corporate income now high enough to sustain expansion programs and still do right by the shareholders, U.S. chemical companies are swimming against the tide by chopping away at debts while other industries are still in the market for considerable outside financing.

*Funded debts minus those portions to be paid within 12 months.

**Allied Chemical & Dye, American Agricultural Chemical, American Cyanamid, Atlas Powder, Commercial Solvents, Diamond Alkali, Dow Chemical, Hercules Powder, Hooker Electrochemical (including Durez), International Minerals & Chemical, Monsanto Chemical (including Lion Oil), Pennsylvania Salt, Pfizer, Rohm & Haas, Union Carbide and Carbon, and Victor Chemical. All data as of Dec. 31 each year, except Dow (May 31), Hooker (Nov. 30) and IMCC (June 30).

acetaldehyde

pharmaceutical raw material
denaturant
chemical intermediate

crotonaldehyde

denaturant
chemical intermediate
specialty solvent

n-butyraldehyde

chemical intermediate
plastic intermediate
pharmaceutical intermediate

isobutyraldehyde

pharmaceutical intermediate
resin raw material
chemical raw material

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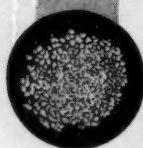
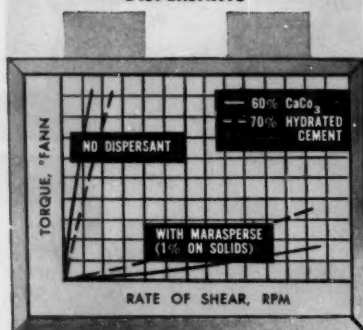
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ADMINISTRATION

WHAT INDUSTRY'S WATCHING ON THE HIGH COURT DOCKET

ANTITRUST:

- U.S. will again be trying to brand Du Pont's investment in General Motors as "monopolistic."
- FTC will attempt to prevent the use of zone-delivered pricing systems by individual companies.
- U.S. Gypsum will be seeking the right to enforce royalty provisions of patent license agreements held illegal in government antitrust litigation.
- Olin Mathieson will seek a reversal of a circuit court ruling that the company violated the Taft-Hartley Act.

PATENTS:

- Colgate-Palmolive wants to upset Carter's aerosol shave cream patent.

OTHER SIGNIFICANT CASES:

- Challenging constitutionality of Food & Drug provisions penalizing intrastate sale of dangerous drugs without prescription.
- Attacking a state court's refusal to prevent publication of a book that belittles Krebiozen, the controversial cancer drug.
- Testing constitutionality of U.S. tariff compacts under GATT.

Coming Edicts for Industry

You can expect new landmarks in regulation of business and industry during the next few months, as various branches of the federal government get set for the fall and winter round of litigation. In prospect: a series of rulings and decisions—mostly by the U. S. Supreme Court—full of significance for the chemical industry.

The Du Pont Question: A number of chemical cases (*see table*) are already on the Supreme Court's docket—scheduled for hearings shortly after the high court convenes on Oct. 1—and others are awaiting approval to be heard. Foremost, of course, is the government's antitrust suit against Du Pont, General Motors and U.S. Rubber (*CW*, Dec. 11, '54, p. 13).

The government—in one of the largest antitrust cases on record—is seeking to reverse dismissal by Federal District Judge Walter La Buy of its charges that Du Pont's investments in General Motors give it control of the auto giant and provide protected markets for its chemical products.

Government trustbusters—contending that Du Pont acquired control of GM for the specific purpose of obtaining an illegal preference with respect to GM's purchase of materials—have asked the Supreme Court to "reap-

praise the undisputed facts in the light of the background which actually existed." The Justice Dept. contends that Judge La Buy—in saying that the evidence did not add up to antitrust violation by Du Pont—erred by adopting an "improper standard" for determining whether Du Pont had control of GM. The court's criterion was whether Du Pont held the equivalent of 51% of GM stock, while the government insisted that Du Pont maintained control by holding 23% of GM's stock at all times since 1918.

Zone-Delivered Price Fixing: The Supreme Court will also hear the Federal Trade Commission's appeal that it be permitted to prevent individual companies from using their own zone-delivered pricing system.

FTC has already proved its conspiracy charges against the lead pigment industry, winning the right to ban collective use of zone-delivered

pricing systems. The lower court ruled, however, that FTC could not ban individual companies from using their own systems. This banning power, FTC says, would be used to prevent "revival" of a price-matching conspiracy.

Superseniarity Appeal: A significant labor case the Supreme Court may have to contend with is an appeal by Olin Mathieson Chemical Corp. from a ruling by the Fourth Circuit Court of Appeals (Richmond, Va.) upholding a National Labor Relations Board order (*CW*, June 16, '56, p. 42). The lower court ruled Olin Mathieson violated the Taft-Hartley Act when it changed its seniority policy, after an unsuccessful strike, to give preference to non strikers and to employees who had returned to work during the strike.

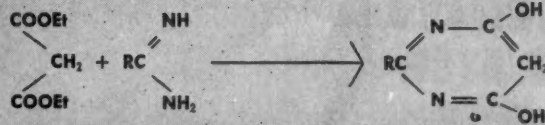
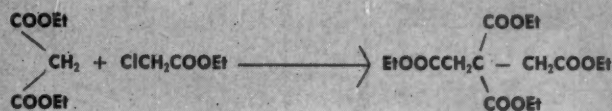
Olin Mathieson—admitting its superseniarity policy discriminated against strikers—argues that this was a lawful measure to "protect and continue" its business.

Colgate Patent Fight: Specialties makers will be particularly attentive observers in Colgate-Palmolive's appeal from district and circuit court decisions that it infringed a Carter Products patent covering aerosol shaving cream (*CW*, April 7, p. 130).

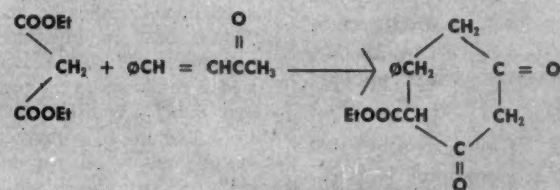
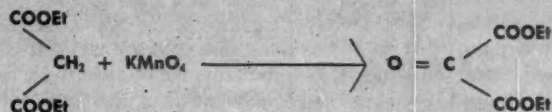
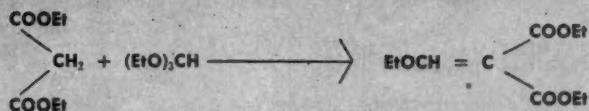
Colgate—asserting that Carter merely combined known ingredients to perform to a known purpose—wants the high court to invalidate the Carter patent. Carter's patent—unless invalidated by the court—covers the use of all pressurized packaging by the soap industry.

Krebiozen—the controversial cancer drug—is once again in the public eye. Krebiozen Research Foundation has asked for Supreme Court review of a denial by the Massachusetts supreme court of a libel injunction against publication of the anti-Krebiozen book, "Krebiozen—The Great Cancer Mystery." The state court said public interest in the discussion of cancer and the constitutional protection of a free press are paramount to private rights involved.

In addition to cases already docketed and others under request for appeal, further activity can be expected from the Justice Dept. and FTC—especially over mergers and alleged monopolies—and from the Securities & Exchange Commission. The outlook is for considerable legal activity that's worthy of close examination by chemical executives.



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ADMINISTRATION



SHAPIRO: Cracking down on alleged conspiracy in discount buying of drugs.

LEGAL

Illegal Discount on Drugs: A special grand jury has accused a Suffolk County (Long Island, N.Y.) official and three other persons of conspiring to misuse the county's name and credit in the purchase of pharmaceutical supplies—allegedly saving \$30,000.

Alvert Freistadt is said to have owned the pharmacy that obtained discounts from drug houses by buying in the name of the Suffolk Home (Yaphank, L.I.)—a county home. He sold the business in 1954 to a corporation that continued to use his name and continued the discount purchases. Irving Garfinkle and William Egelman—named as employees of the corporation—were indicted with Freistadt and J. Milford Kirkup, Jr., county commissioner of welfare. Kirkup had been charged by State Investigation Commissioner J. Irwin Shapiro with assisting in the drug purchases.

Noise Trial Ends: Magistrate Archibald A. Wacker has ruled that Metals Disintegrating Co. (Elizabeth, N.J.) is not guilty (as charged by the state) of violating a Union, N.J., ordinance prohibiting "disturbing noises" (CW, Aug. 25, p. 30).

Rejecting a plea by Defense Attorney Thomas L. Morrissey to declare the ordinance unconstitutional, Judge Wacker said the state had failed to prove beyond a reasonable doubt that the noise in question—made by a

dust collector fan at the metals plant—was detrimental to health.

Plastic Sheeting Patent Suit: Judge Thomas Meaney (U.S. district court, New Jersey) held that U.S. Chemical Co.'s (Metuchen, N.J.) patent, U.S. 2,668,328, covering a process for the production of plastic sheeting, was invalid and not infringed by Plastic Glass Corp. (Newark, N.J.). The basic material is methyl methacrylate monomer.

The patent-holder—a wholly owned subsidiary of U.S. Plastic Products Corp. (Metuchen)—sold the sheeting commercially for more than one year prior to filing a patent application. The court held that the inventor ignored a section of the patent statute that says, "A person shall be entitled to a patent unless the invention was in public use or sale in this country more than one year prior to the date of the application for patent in the United States."

Stanton Lawrence, attorney for U.S. Plastic Products, told CW the parent company plans to appeal the decision. "We will take the same position in appeal as we did in the district court," Lawrence said. "We maintain we sold only the product of the process, not the process itself which the patent covers." Judge Meaney decided that selling the product of the process was the same as putting the process on sale.

LABOR

Profit-Sharing: Three large concerns with chemical process activities are making news this fortnight with their respective kinds of profit-sharing programs.

- Under the plan approved by stockholders last year, Monsanto Chemical Co. (St. Louis) is granting three-year options on 400,000 shares of its common stock to its 20,000 salaried and hourly employees. Participation will be based on 30% of current individual annual incomes, with per-share price set at about \$38.30—or 95% of the stock's high-low average in Sept. 7 trading on the New York Stock Exchange. Each employee may put up to 10% of monthly earnings into the plan, and Monsanto will pay 3½% interest on all deposits.

- Annual profit-sharing checks for employees of Quaker Oats Co. (Chi-

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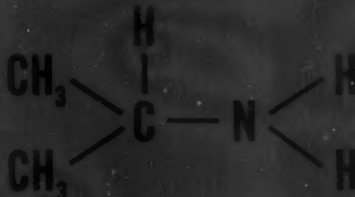
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TODAY a compound of tin is doing a remarkable job as an anti-wormant in veterinary medicine. A few years ago Dr. Salsbury's Laboratories, pioneers in poultry pharmaceuticals, were looking for a chemical that would be non-toxic for poultry, but effective against the deadly poultry tapeworm, *Raillietina cesticillus*. For experimental purposes hundreds of compounds of tin were supplied by Metal & Thermit. M & T Dibutyltin Dilaurate is now contained in two patented formulations of Dr. Salsbury's "Wormal," one of the most effective poultry tapewormers ever developed.

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ADMINISTRATION

cago) total more than \$1.6 million. The company observes that this will add an average of more than 3½ weeks' extra pay to individuals' regular earnings.

• Eastman Kodak Co. (Rochester, N.Y.) is extending its employee wage dividend plan to cover higher profits in more successful years. As before, President A. K. Chapman explains, lump-sum payments will be based on two factors: individuals' five-year earnings, and cash dividends on common stock. When dividends are \$1.80/share or less for the year, employee payments are computed at 0.5% of five-year earnings for each 20¢ by which stock dividends exceed 70¢/share. The rate is 0.1% for each 20¢ between \$1.80 and \$2.80; and now the plan calls for adding 0.05% for each 20¢ by which stock dividends exceed \$2.80/share.

2 Ended, 2 Averted: Picket signs were going back into storage this week following agreements for unionized employees in plants making butadiene, zinc, nickel and copper. Strikes were ended at the Louisville butadiene plant of Publicker Chemical Corp. (Philadelphia) and the Ogdensburg mine of New Jersey Zinc Co. (Newark); and threatened strikes were averted at various Canadian plants of International Nickel Co. (New York) and at the Kennecott Copper Corp. (New York) refinery in Garfield, Utah.



EASTMAN'S CHAPMAN: For employees, a share in higher earnings.

KEY CHANGES

Marlin G. Geiger, to executive vice-president, chemical group (composed of the company's seven chemical divisions); and **William E. McGuirk, Jr.**, to president, Davison Chemical Co. (Baltimore); W. R. Grace (New York).

William M. Smart, to vice-president, Union Carbide Nuclear Co.; **T. J. Coleman**, to associate technical director, Union Carbide Development Co.; and **Wilfrid S. Sherk**, to technical director of operations, Electro Metallurgical Co.; all divisions of Union Carbide and Carbon (New York).

Foster B. Whitlock, to executive vice-president, Ortho Pharmaceutical Corp. (Raritan, N.J.).

Bentley G. McCloud, Jr., to director, Dayton Rubber Co. (Dayton, O.).

A. T. Maasberg, to director, research and development, Midland Division, Dow Chemical (Midland, Mich.).

John L. Smart and **Paul D. Scott**, to directors, Dow Chemical of Canada Ltd. (Sarnia, Ont.), subsidiary of Dow Chemical (Midland, Mich.).

Bruno H. Wojcik, to director, research, industrial chemicals division, Olin Mathieson Chemical (Baltimore).

Frank L. Weil, to board chairman, B. T. Babbitt, Inc. (New York).

Robert W. Nelson, to director, central administrative staff, and **James W. May**, to director, technical training, American Air Filter Co. (Louisville).

Maurice B. Parmelee, to director, secretary and treasurer, Sun Oil Ltd. (Toronto, Ont.), subsidiary of Sun Oil Co. (Philadelphia).

RETIRED

G. Cullen Thomas, vice-president, General Mills, Inc. (Minneapolis).

DIED

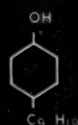
James J. Kerrigan, 62, board of directors' executive committee chairman, Merck & Co. (Rahway, N.J.), at New York.

Benjamin Duggar, 84, research consultant, Lederle Laboratories (Pearl River, N.Y.), and leader of research team that discovered Aureomycin, at New Haven, Conn.

Intermediates

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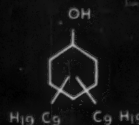
Nonylphenol



M.W. 220

For the manufacture of anionic and nonionic detergents; lubricating oil additives, antioxidants and petroleum demulsifiers, and for the manufacture of resinous polymers for use in protective coatings and plasticizers.

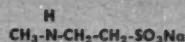
Dinonylphenol



M.W. 346

N-Methyltaurine 22

N-Methyltaurine 55



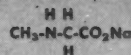
Intermediate for the manufacture of dyestuffs, detergents, pharmaceuticals, and other organic compounds.

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Sarcosine, Sodium Salt



Intermediate for anionic surfactants and stabilizer for Rapidogen® dyestuffs.

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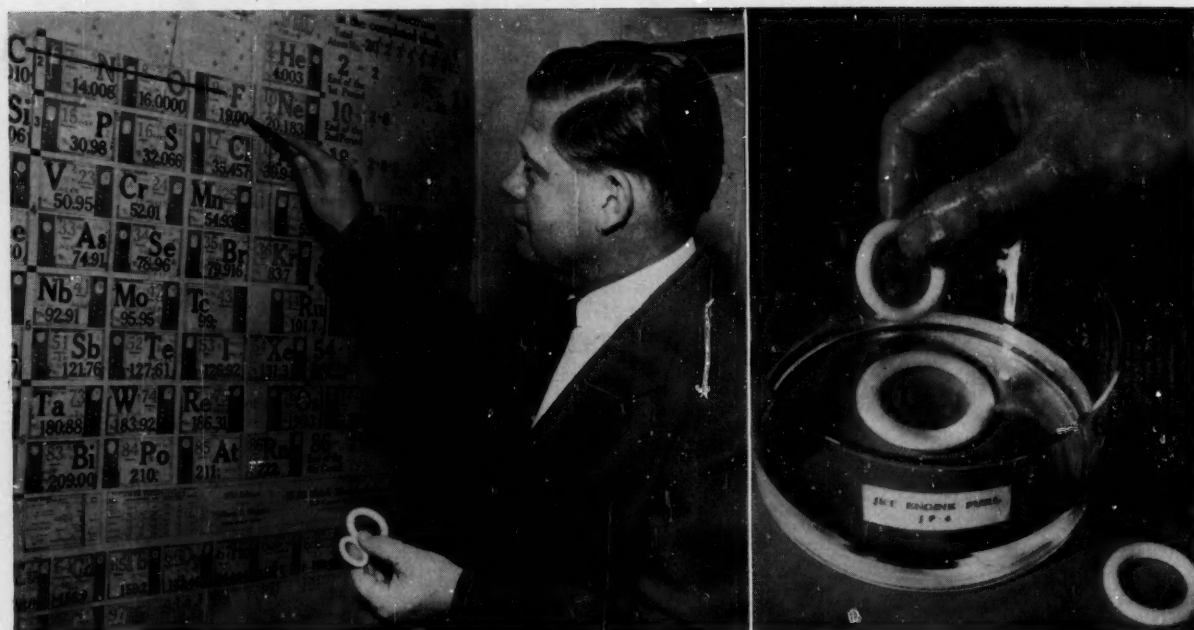
From Research to Reality



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DOW CORNING'S HUNTER: In fluorine, a buttress for solvent resistance*.

Silicone Hybrid Staves Off Solvents

Polymer chemists are busily seeking out compounds to meet Air Force demands for a new rubbery material that will stave off solvents, give good performance over the -80 F to 400 F temperature range. This week, a commercial aspirant for this rugged job was making its debut. Named Silastic LS-53, it's a fluorosilicone rubber, one of the first commercially promising fluorine-silicone hybrids to be made. Although Dow Corning won't reveal the material's chemical identity, it is probably a polymer of trifluoropropyl methylchlorosilane.

Synthesizing a fluorinated silicone is a research accomplishment in its own right. But the new product is not intended as an academic curiosity. Dow Corning proudly points to the fact that it is the first solvent resistant elastomer that flexes such low temperatures.

Other fluorocarbons have been able to match its performance at high temperatures (e.g., Kel-F elastomer, *CW*, March 20, '54, p. 50, Minnesota Mining's Poly-FBA, *CW*, Sept. 11, '54, p. 54). And other silicones have been able to withstand the temperature

extremes, but without the solvent resistance. Dow Corning's entry, however, may soon have competition.

For example, General Electric (Watertown, N.Y.) says it is readying a nonfluorinated, competitive silicone rubber, expects to market it in the near future at around \$5/lb. And both Du Pont and M. W. Kellogg have experimental, fluorinated elastomers (not silicones) that may eventually qualify for the stringent Air Force duties.

Du Pont's elastomer reportedly is cured with polyamines or organic peroxides to produce vulcanizates that resist temperature up to 500 F when in contact with air, petroleum oils, diester lubricants and ester hydraulic fluids.

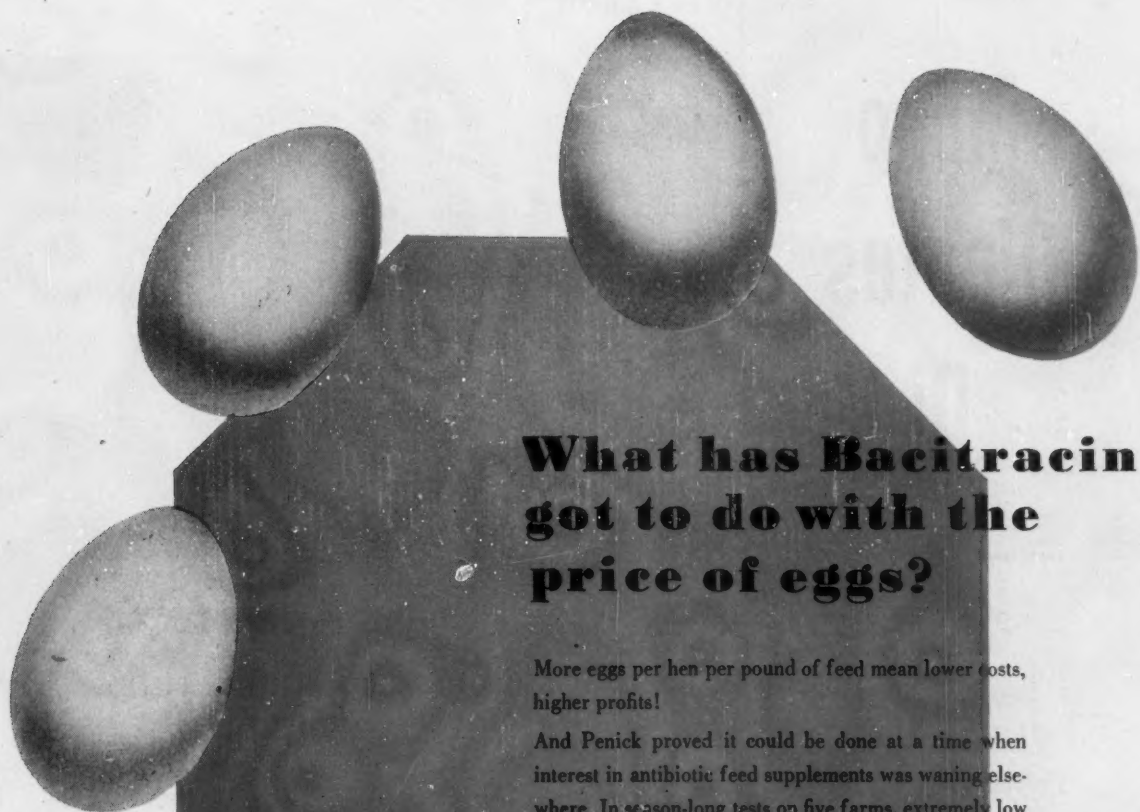
Dow Corning's research director, M. J. Hunter, explains that Silastic LS-53 is a molecular hybrid which combines the desired properties of both silicone rubbers and fluorocarbon plastics. It's said to compare in hardness, tensile strength and elongation

to good, all-purpose silicones, feature resistance to aircraft fuels (e.g., a 70% iso-octane, 30% toluene mixture), hydraulic fluids (including phosphate and silicate esters) and petroleum-based engine oils. Intended for O-rings, aircraft hoses, etc., it's available to fabricators for aircraft applications only at \$30/1-lb. sample. Price is expected to drop as production rises.

Cooperative research by the Air Force, Dow Corning, Peninsular Chem Research, Inc. (Gainesville, Fla.) and Purdue University turned up the novel silicone. According to the Air Research and Development Command's Wright Air Development Center, the feasibility of a fluorinated silicone was first indicated at Purdue University Research Foundation (working under an ARDC contract), and the key intermediate was produced at Peninsular Chem Research (also under contract). Dow Corning used its own research funds to find a way to polymerize the intermediate.

For its investment, it got a new compound that is a long step toward a goal that once looked unattainable.

*In test (right), 24-hour immersion in JP-4 engine fuel swells conventional silicone rubber O-ring, leaves fluorinated silicone rubber (Silastic LS-53) almost unchanged.



What has Bacitracin got to do with the price of eggs?


More eggs per hen per pound of feed mean lower costs, higher profits!

And Penick proved it could be done at a time when interest in antibiotic feed supplements was waning elsewhere. In season-long tests on five farms, extremely low levels of our exclusive Bacitracin Methylene Disalicylate substantially improved egg production and hatchability. Fewer hens died. Even culls started to produce!

This is an illustration of Penick's leadership in the research, manufacture and application of specialized antibiotics. Among the pioneers in the field, we manufactured Tyrothricin, the first antibiotic commercially available! Today our modern fermentation plant produces both mold and bacterial antibiotics . . . currently a total of nine . . . for use in pharmaceuticals, cosmetics, animal feed supplements and veterinary medicine.

But antibiotics comprise just one phase of Penick's unique versatility. From our laboratories and plants flow a diversity of products that include: aromatic compounds, botanicals, flavors, extracts and alkaloids, gums, spices and agricultural and pharmaceutical chemicals. *If you use these or related products we shall welcome the opportunity to tell you what we can do for you.

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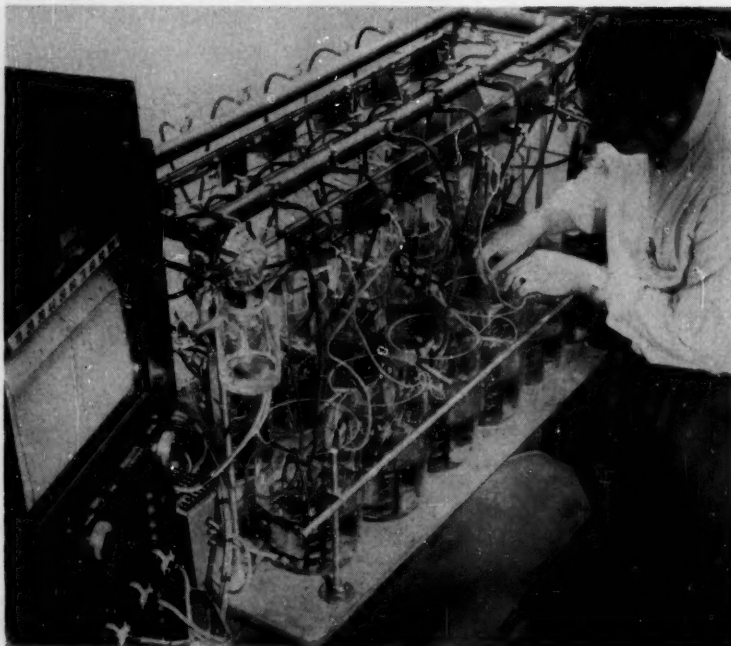
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RESEARCH



NATIONAL CARBON'S YEAGER: In fuel cells, new power.

Fuel Cell Entry

A top project at National Carbon's new Parma, O., labs—dedicated this week—is research on fuel cells. These devices (laboratory models are shown above) combine different gases, route the electrons temporarily freed by the exchange through a circuit to produce electric current. Doing this at low cost and high efficiency is a problem that has challenged top researchers both here and abroad since 1839*.

At Parma, laboratory director Robert Breckenridge and researchers John Yeager and Karl Kordes are investigating a fuel cell that consists of porous carbon layers immersed in caustic solution, utilizes hydrogen and oxygen to produce electricity. Their aim: to develop improved fuel cell carbon elements that will last for long periods under relatively high currents.

Research of this kind could lead to practical applications. Because the cells yield steady electrical currents as long as oxygen and hydrogen are fed into them, they may eventually provide a source of auxiliary power in chemical plants where these gases are by-products of commercial proc-

esses. Too, the cells could be used as power supplies for signal buoys or other equipment that gets infrequent maintenance.

One fuel cell, developed in Britain, is receiving serious consideration for use in electric railways and municipal generating plants (to help smooth out peaks and valleys of demand). Fuel cells provide greater storage capacity per pound than do lead cell batteries, occupy less space.

But the British cell (*CW*, May 28, '55, p. 50) has an over-all efficiency of 40% vs. 75% for conventional lead cells, uses expensive nickel electrodes (instead of carbon)—in addition to hydrogen, oxygen and alkali. It was designed by Cambridge University's F. T. Bacon.

Another new fuel cell, developed in West Germany (*Chemical Engineering*, February, p. 110), is similar to the Bacon cell.

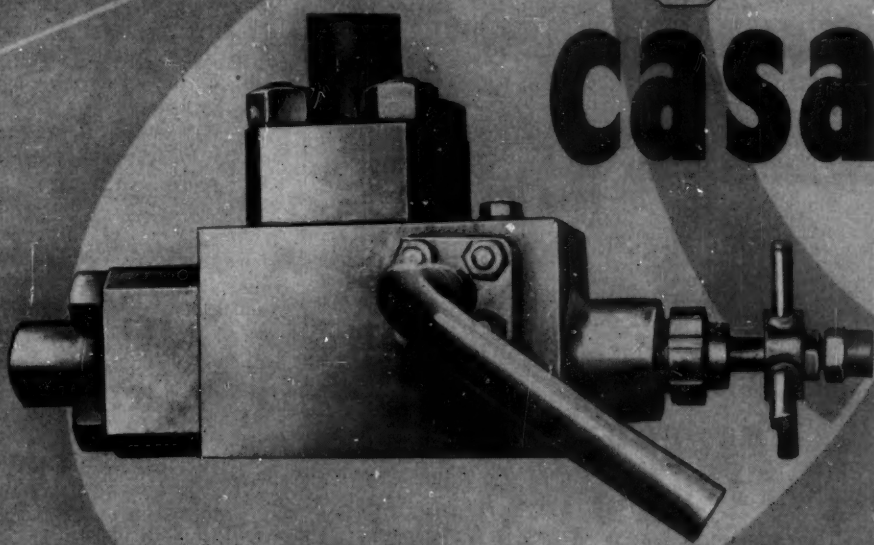
Pittsburgh Consolidation Coal was assigned two patents on a carbon monoxide-hydrogen fuel (coal gas) cell a few years ago (*CW*, Feb. 23, '52, p. 42), thinks fuel cells might turn out to be a way to utilize coal more efficiently.

*When Sir William Grove devised the first fuel cell.

for low-cost **NH₃**



casale



**casale ejector eliminates
recirculating compressor**

Recirculating unconverted synthesis gas from the reactor, this simple ejector, with no moving parts, is one of many reasons for the economy, dependability and easy operation of the Casale process.

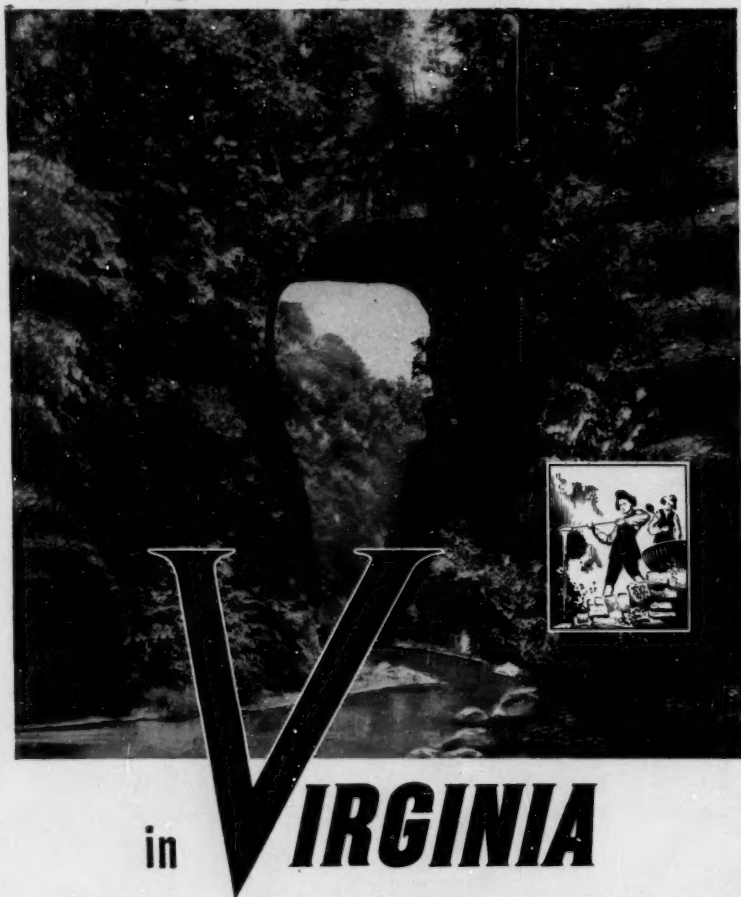
Five Casale plants for low-cost Ammonia synthesis, designed and built by Foster Wheeler, are in operation at higher-than-design capacity; three more FW Casale plants, with a combined capacity of 585 tons per day, are now in the design or construction stage.

For complete information on the cost-saving advantages of the FW Casale process, write for Bulletin 0-54-1. Foster Wheeler Corporation, 165 Broadway, New York 6, N. Y.

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Twenty-Shilling Munitions Plant



in

VIRGINIA

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Virginia industrial sites now run a bit more than 20 shillings. But they're still a top bargain. For they hold many a profit advantage for your new plant.

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wood . . . and industrial farm products.

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RESEARCH

High Polymer Hypo

Last week, the National Science Foundation launched a financial aid program intended to quicken progress in fundamental research and development of high polymer elastomers (see p. 38).

There has never been any doubt about official support for the program. The foundation directors formally approved it last December; President Eisenhower gave his approval in April. But now the foundation has decided where and how to put the program into effect.

To support 17 basic research projects in high polymers during the next one to three years, NSF distributed \$687,000 among universities, a research foundation (Mellon Institute, Pittsburgh, Pa.), and the National Bureau of Standards.

Several of this year's grants will support the quest for new inorganic polymers that possess high temperature stability. Among inorganic "rubbers" whose structures will be probed are the phosphonitrilic chlorides, plus a long list of polymers to be made—many for the first time—from such elements as boron, aluminum, germanium, titanium, tin.

Other grants will help probe:

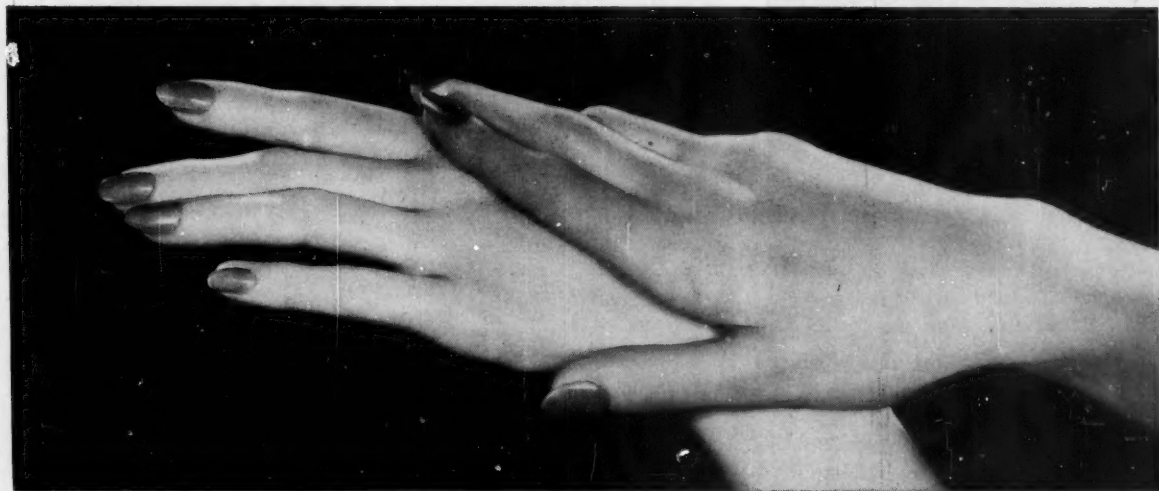
- Mechanisms of polymerization and polymerization inhibitors; of synthesis of addition polymers; of initiating polymerization by free radical initiators; of polymerization catalyzed by organoalkali metal reagents, including the alfin catalyst.

- Rheology of polymer solutions and the function of concentration, temperature, solvent and molecular weight distribution; of amorphous polymers; and the structure and rheological properties of high polymers.

Other basic projects will seek insight into molecular weight distribution of polymers; the physical chemistry of high polymers, including proteins; the quantum mechanics of coiling-type polymers and distribution of molecular lengths (using high-speed computers); the stereoisomerism of polymers as they affect properties; block polymers—with polymerization initiated by electron-transfer to the monomer; basic chemistry of condensed phosphates—a key to understanding the synthesis and properties of inorganic polymers; the mechanical



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and the **SHEEN** of nail **POLISH**

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The many popular hues of automobile lacquers and the bright beauty of milady's nail polish depend upon high-quality active solvents for their outstanding durability and appearance. Enjay Ketones and Solvents meet the most exacting requirements of the surface coating industry—for lacquers and enamels, paint, varnish and enamel removers.

Enjay, long a leading supplier of active ketones and solvents, offers the complete, modern facilities of the Enjay Laboratories to supply you with technical information on the application of *any* Enjay petrochemical. Call, write or wire for full details.

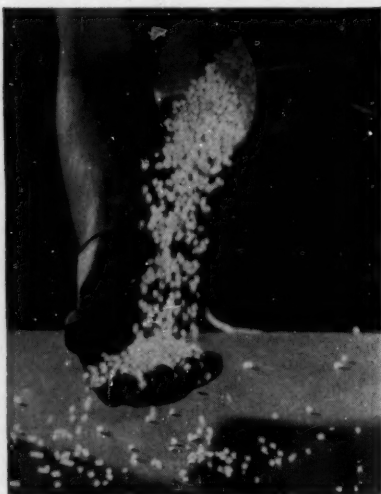
Enjay offers a diversified line of petrochemicals for industry:

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Petrochemicals*

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"Doesn't cake, easy-handling, needs less storage space"—that's Du Pont *Pelletized* Sodium Nitrite! Here's the only type that flows freely after months of storage—and without being contaminated by anti-caking agents.

Handling's fast, and because *pelletized* Sodium Nitrite has a bulk density about 15% higher than the usual granular forms, you save plenty of useful space. Prompt delivery, too—our 9 strategically located warehouses and many jobber outlets see to that!

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**DU PONT
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Better Things for Better Living... through Chemistry

RESEARCH

relaxation and retardation spectra of polymers and their relation to polymer chain structure.

Goal of all the NSF-financed studies is to fill gaps in present knowledge of the relationships of the composition, structure and properties of polymers — including the industry-pioneered *cis*-polyisoprene (synthetic "natural" rubber).

APPARATUS

Atmospheric Simulator: Equipment that can simulate nearly all atmospheric conditions is offered by Hudson Bay Co., a division of Labline, Inc. (Chicago). Units range from standard general test cabinets to specially engineered chambers capable of reproducing conditions of —175 and 550,000-ft. altitude.

Multisample Dialyzer: Oxford Lab-

oratories (San Francisco) is out with a new dialyzer that simultaneously treats as many as 16 separate 20 ml. samples for either equilibrium or concentration dialysis. Called the Oxford Model B Dialyzer, it's said to be particularly useful in equilibrating materials for subsequent electrophoresis or concentrating fractions after continuous-flow paper electrophoresis has been done.

Improved Pot Still: An improved type of high-vacuum pot still—reportedly the first of its kind to utilize direct agitation of the distilland—is available from Arthur F. Smith Co. (Rochester, N.Y.). Called the Asco Model P, it's said to be capable of limited fractionation of organic materials up to a molecular weight of 700. It has a distilland capacity of up to 2 liters, output of 1 liter/hour.



More Power for Stream Studies

FIELD STUDIES of stream pollution get an assist from this new combination pH amplifier and recorder developed by The Bristol Co. (Waterbury, Conn.). Completely portable and weatherproof, it

operates for at least 24 hours without an external power source. Bristol expects the device to be used in checking industrial wastes and effluents from sewage treatment plants.

Which CANCO pressure container suits you best?



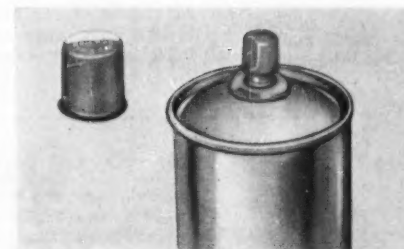
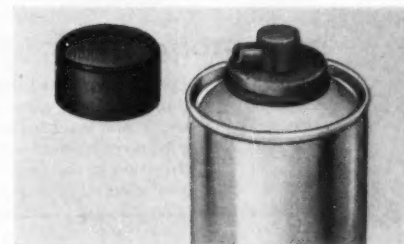
It's the most complete line in the industry, so you will find exactly what's needed. The Canco one-inch cup opening top, or the individually styled one-piece tops, will accommodate a wide variety of valves and are readily adaptable to all filling and closing equipment in use today. Check these important advantages that add up to substantial economies.

- 1. Lower initial cost.** Canco pressure containers cost you less because they're mass-produced on standard high-speed can manufacturing equipment.
- 2. Variety of sizes and styles.** Canco now offers you five popular sizes of containers: 3-oz., 4-oz., 6-oz., 12-oz., and 16-oz.—available with either one-inch cup tops, or the one-piece tops, which eliminate costly extra parts in your packing operation.
- 3. Canco works directly with valve makers and contract loaders.** This developmental "teamwork" gives you the most economical and efficient package.
- 4. Canco has many strategically located facilities.** You're assured of prompt, efficient service in all phases of pressure packaging.

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Whether your product
sprays, mists or foams,
Canco's pressure containers
can save you up to 35% on
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CONOCO H-300

*the extender
of profit*

**Try it as a secondary plasticizer
with polyvinyl chloride resins.**

As a primary plasticizer extender, the advantages of Conoco H-300 merit the consideration of all quality-minded and cost-conscious formulators using polyvinyl chloride resins. Some of these are:

EXCEPTIONAL LIGHT STABILITY



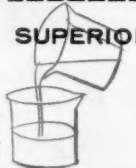
Tests prove that films containing Conoco H-300 show light resistance equal to, or better than, those with no extenders—a unique contribution in the field of secondary plasticizers.

UNUSUAL LOW TEMPERATURE FLEXIBILITY

Marked improvement in low temperature flexibility is shown in films made with Conoco H-300.



SUPERIOR VISCOSITY CONTROL



Mixtures containing Conoco H-300 have appreciably lower initial and aged viscosities.

ECONOMY

Can save the processor as much as 2 cents per pound on the finished product. Conoco H-300 can be used to the extent of 25% of the total plasticizer required.



IMPROVED MIXING

Formulations are more readily mixed because of fast wetting and internal lubricating properties.

Write for your copy of the new booklet on Conoco H-300, the Extender of Profit: Continental Oil Company, Petrochemical Department, Division C9, 630 Fifth Avenue, New York 20, New York—1353 No. North Branch Street, Chicago, Illinois.



Conoco H-300 is available in either tank cars or drums. Samples available on request.



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Petrochemical know-how from the ground up!

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CONTINENTAL OIL COMPANY



SPECTRA UNLIMITED: Color makers take cues from technology. CIBA CO. INC.

C W Report

by David Randall and Richard Berger

The Dynamic Dye and Pigment Industry

It's cashing in on the consumer's growing color consciousness



U.S. color producers, now the world's leaders in the production, marketing and researching of synthetic organic dyes and pigments, last week marked the centennial of William Perkin's historic synthesis of mauve.

At the beginning of 1956, U.S. organic dye output hit 167.5 million lbs./year—a good 61 million lbs. ahead of the runner-up, West Germany. U.S. pigment makers were producing at the rate of 44.5 million lbs./year. Combined dollar sales for dyes and pigments were valued at \$245 million/year.

Yet, 50 years ago, half a century

after Perkin's synthesis launched Europe's synthetic dye industry, organic color production on this side of the Atlantic was still nil. By 1914, U.S. plants were filling only 10% of domestic synthetic dye needs. Total domestic output of synthetic color that year was 6.6 million lbs., valued at \$2.5 million.

Imports for that year were 46 million lbs. Furthermore, almost all of the intermediates used by domestic plants in dye manufacturing were imported from Germany.

World War I might be described as the spark that set off the explosive growth of the dyestuff industry in this country. Imports were completely cut off after 1917. What few raw materials were available here for making dyes had to be directed to war items, such as explosives and gases. The major consumer of dyes, the textile industry, was seriously handicapped, and decidedly inferior domestic colors were used.

Faced with such a dire dye outlook,

U.S. companies began a rapid program of domestic expansion, and by 1918 there were 78 domestic producers, a 10-fold increase over 1917. These 78 companies accounted for 58.5 million lbs. of dyes, valued at \$67.6 million. By 1920, there were about 100 domestic manufacturers turning out over 88 million lbs. of dyes per year, valued at over \$96 million. Also, only domestic intermediates were used.

The industry accomplished this huge feat of expansion with the assistance and encouragement of such federal legislation as: the Revenue Act of 1916, placing special duties on imported dyes; the Trading with the Enemy Act, granting licenses for the manufacture and sale of products covered by enemy patents; the Dye and Chemical Control Act of 1912, prohibiting importation of dyes unless they were not reasonably obtainable from domestic industry; and the Tariff Act of 1922, which virtually prohibited imports of low-priced dyes.

In the period between the two World

Pigment production—such as that shown at American Cyanamid's Bound Brook, N.J., plant—is bounding ahead five times faster than dyes.

INDUSTRIAL DESIGN, ALEXANDRE GEORGES

Meet the Authors

CW report readers will recognize DAVID RANDALL (right; Ph.D. '41-Pennsylvania State University) as one of last week's AATCC Perkin Centennial guest speakers. He's technical assistant to the dyestuff sales manager at General Dyestuff Corp. (General Aniline & Film). As such, he helps maintain close liaison between sales, manufacturing and research.

Coauthor RICHARD BERGER (Ph.D. '55-New York University) works at GAF too, in the post of market research engineer. Since 1950, he has been specializing in dye and pigment product market analyses, sales studies, and surveys. Berger teaches statistics at Rutgers University College and marketing evenings at CCNY.



CUSTOMERS FOR COLOR

Breakdown of \$245 million worth of synthetic-color sales in '55*

Textiles 70%

Paper 10%

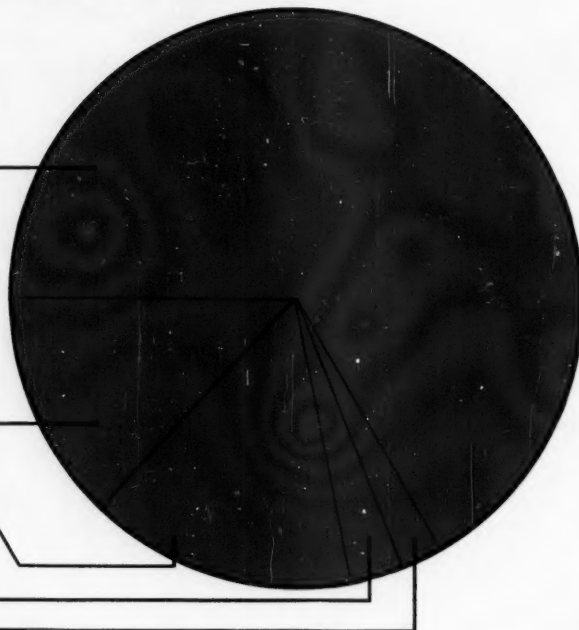
Plastics
Paints
Inks 12%

Leather 3%

Other uses 5%

100%

*CW estimate



C W Report

Wars, there was a strong tendency toward consolidations, mergers and sales of dyestuff companies until there were only 47 companies in 1942. Du Pont, Allied Chemical & Dye Corp., and American Cyanamid Co. were among the leading companies expanding in this manner. It is estimated that these companies accounted for 60% of the entire U.S. output of dyes in '42; General Aniline & Film and Cincinnati Chemical Works produced about 20% of the total that year.

World War II was a period of decided prosperity for American dyestuff companies. Demand for dyes was exceptionally strong as a result of huge military requirements for textiles and strong civilian buying power. Imports of dyes—mostly high-priced items—were virtually shut off. Therefore, it was necessary for American

companies to greatly expand production of the higher grades, thus somewhat changing the complexion of the industry.

In the immediate post-World War II period, American dyestuff companies continued to prosper. For one thing, the dye industries of the main enemy countries—Germany, Italy and Japan—had been weakened. The dye industry in the U.S., however, had not greatly expanded production during the war. Total new investment was in the neighborhood of only \$2.5 million. The return to almost full civilian dye production brought with it a much greater variety of color than was available before the war.

Demand for dyestuffs over the past few years has temporarily declined. The reason for this can be traced largely to the textile industry, which has been suffering a private depression of its own while the remainder of the economy has been prospering. Increased imports of colored textiles is another factor.

Since it is estimated that roughly over three-quarters of all dyes used in the country are for textiles, it can be seen how closely the two industries

are allied. However, output of dyes for uses other than textiles has been continually expanding, and research is constantly being done on new uses so that the dyestuff industry will not have to depend as much on textiles for its livelihood as in the past.

Marketing Catalyst

Not the least of the influences molding the dye and pigment industry's future is the emergence of color as an increasingly powerful marketing catalyst.

Since World War II, industry has become conscious of color as never before. New uses of color have caused a revolution in all divisions of the science of marketing. Product appeal leans heavily on the harmonious use of color. Recent color research indicates clearly that color affects consumer buying habits in a manner previously unrealized. Today the selection of a major consumer investment, such as an automobile, is frequently decided on the basis of a color scheme.

No longer can a product line stick to one or two colors without losing ground in its sales. A prediction of

several years ago that soon important household appliances would be colored rather than white has recently come true. Hospital white is no longer considered desirable for the refrigerator, range or dishwasher.

Unquestionably, color television will speed the color revolution. The consuming public will be educated and conditioned to the use of color in combinations previously regarded as daring. Color will play an even more important part in packaging, with the coming of color television.

Even today, obsolescence of many products is attributed to style changes alone. And color is a key element of style.

Color preferences do change. Attempting to predict color trends remains a dye manufacturer's peculiar problem. A shade can remain with us for one season or stay for several—e.g., pink in all its many applications. This situation has commonly led to oversupply in one instance and lack of supply in another. This is a batch industry with long lead times, and the

situation often can become very unpalatable from the standpoint of inventory control.

However, the color cycle is not wholly unpredictable. More and more manufacturers are using research in an attempt to forecast the consumer's preferences in color.

In the new uses for color, organic pigments play an expanding role in comparison with organic dyes, which are the main application class for textiles. These uses for pigments in paints, printing inks and plastics are reflected in the sharper rate of the growth curve for pigments versus that for dyes.

Production Trends

The organic dyestuff and pigment industry has undergone many changes over the years. Although the trends of production and sales for total dyestuffs and pigments have been upward, trends within the various groups have not been consistent.

In fact, trends of total dyestuffs vs. those of total pigments have varied

considerably. Since 1936, pigments have definitely shown a much sharper rise than dyes. As can be derived from the figures shown elsewhere in this report total dye production has increased only 40% since '36, while total pigment production has increased by 189%, or approximately five times as fast. Dollar sales of pigments have grown 530% in the same period, compared with a 184% gain for dyes.

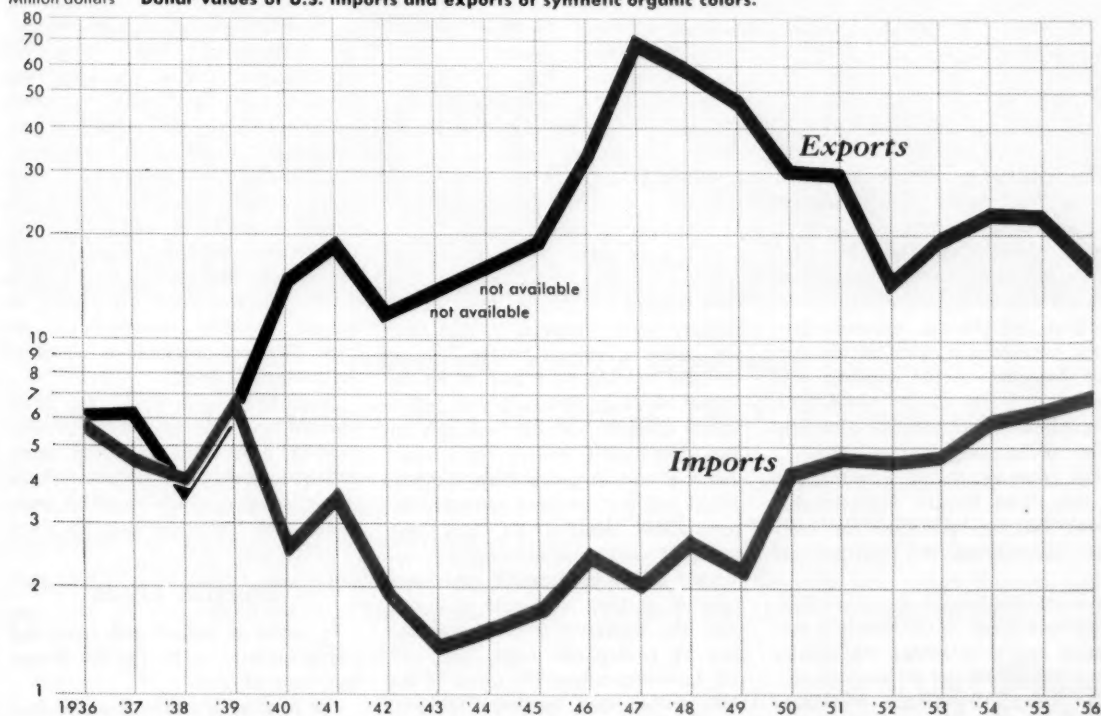
One of the basic reasons for such a difference: pigments have so many other uses outside of textiles—in industries such as plastics, printing inks, paints, and resin materials. As explained elsewhere in this article, pigments are also becoming increasingly popular in textiles (e.g., pigment printing, spin "dyeing" with pigments), replacing some of the more expensive dyes.

The charts on pp. 65-67 (U.S. Tariff Comm. figures) give the percentage increases of 1955 pound production over 1936 pound production, by group.

There are, of course, many reasons for the changes shown, but here only

IMPORT VALUE IS ON THE WAY UP

Million dollars Dollar values of U.S. imports and exports of synthetic organic colors.

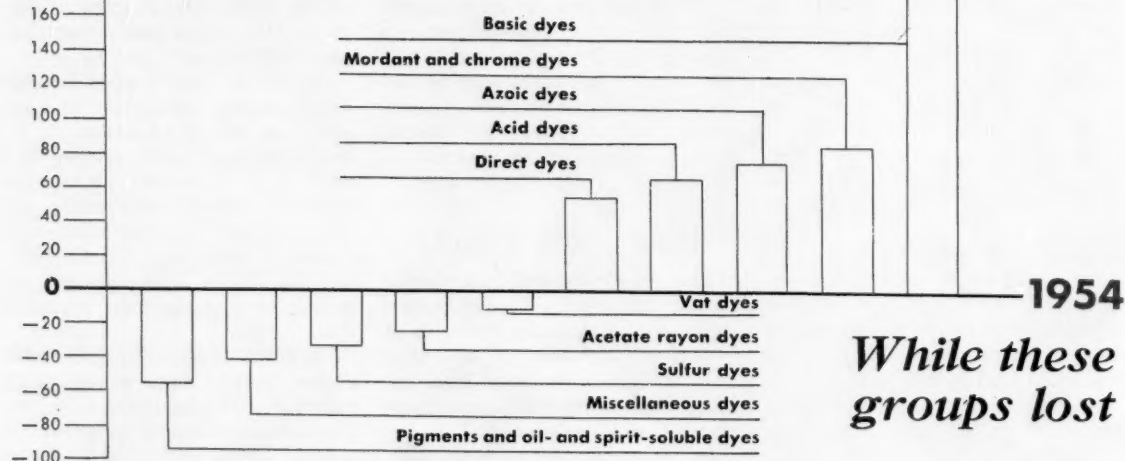


(CW est.)

Dollar imports
(% change)

U.S. SYNTHETIC COLOR IMPORTS IN 1955...

These groups gained over '54



While these groups lost

C W Report

a few outstanding ones need be mentioned. The acetate rayon group has been one of the better acting ones for the simple reason that this type of dye is most often used on the new synthetic fibers. Direct and acid, in addition to mordant and chrome, dyestuffs have lost a considerable share of the dyestuff business. Acid, mordant and chrome dyes are chiefly wool dyes, have suffered most from the encroachments of the newer synthetic fibers.

The great increase in azoics is due to the trend toward higher-quality dyeing that has prevailed for some time. More about this will be said later.

An examination of the charts (pp. 65-69) will reveal mixed trends in production and sales among the various groups, based on the 20 years shown. Sales in terms of dollars, of course, are all upward, due to two main fac-

tors: the prevailing inflationary tendencies and the trend to higher quality and thus higher-priced dyes within each classification.

Some salient points should be mentioned to aid in the understanding of these charts. The dip in 1938 was due mainly to drastic curtailment of the U.S. dye export trade with the Orient. Indigo and sulfur black, which are relatively cheap dyes, were also being replaced by other higher-priced dyes in the domestic market.

The huge output of dyes in 1941 resulted from increased demand for dyes to meet vital textile needs of the military forces. Exports in that year also were relatively heavy, because German supplies were shut off by the British blockade. Stockpiling in anticipation of entry into war was also an important factor. Finally, of course, there was a large civilian market, which had not yet been restricted by government controls. In later war years, of course, production was restricted by the government, and large supplies of basic dye raw materials were also converted to other wartime uses by government edict. The war did, however, bolster the trend to vat dyes (other than synthetic indigo), and much more effort was directed

toward domestic production of these higher-quality anthraquinone vats with their all-around fastness properties.

In 1947, production of dyes reached an all-time record of 212 million lbs., despite the many raw-material and intermediate shortages. The immense war-born pent-up demand for dyes, both domestically and abroad, caused this record output. The sharp 34% drop in production occurring in 1949 resulted chiefly from the general decline in demand, here and abroad, and the fact that domestic companies were experiencing increased competition in foreign markets from the revival of industry in other dye-exporting countries. Greatest decreases occurred in the low-priced dyes.

Since 1950, with its Korean War-inspired boost for all dyestuff groups, dyestuff production has been fairly closely following the fortunes of the textile industry, which, as earlier mentioned, has had more than its share of difficulties.

Textile Dyes

In terms of dollars and cents, the textile industry is by far the largest consumer of dyes.

But percentage consumption of dyes by trades is changing. In 1946, it was

Detroit . . . where Dow caustic serves alkali compounders.

DOW



wherever you're producing

DEPENDABLE CAUSTIC SODA TECHNICAL AID IS ASSURED FROM DOW

Dow is the one producer, you know, supplying caustic soda to industry everywhere. Wherever you produce, you're sure of getting rapid, dependable service from Dow.

Dow also offers technical service to its customers. Trained men from this department are on call to help you get best

results from the caustic used in your operation.

Then, too . . . Dow customers benefit from continual process research, stringent quality control, flexible delivery network. Does Dow have your order? THE DOW CHEMICAL COMPANY, Dept. AL 757B, Midland, Michigan.

you can depend on DOW CHEMICALS

DOW

LIQUID MUSCLES for decorative fabrics are provided by **PLIOLITE LATEX** in the form of lightweight, odorless backings that assure dimensional stability, improve body and drape, resist raveling, tearing and snagging—permanently!



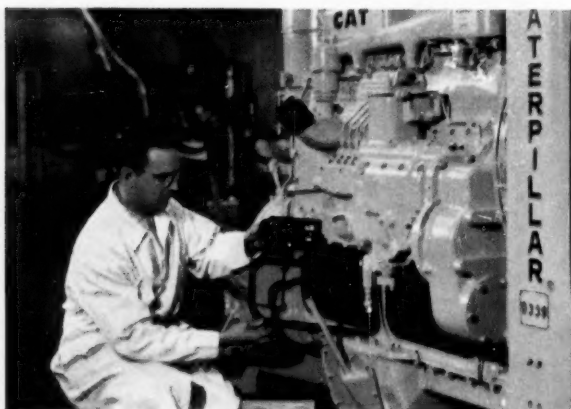
MADE TO ORDER FOR ROOF-RAISERS are concrete floor enamels based on **PLIOLITE S-5**. They fully resist the attack of alkalis and moisture, hard wear and other abuses that raise the roof with ordinary enamels.



How to market a product



MAGIC IS PUT INTO CARPETS by backings based on **CHEMIGUM LATEX**. They not only impart stiffness, increase weight and dress down fuzziness, but also prevent raveling and skidding, resist scrubbing and dry cleaning and won't support mildew.



THE CAT'S MEOW is gasketing made of paper impregnated with **CHEMIGUM LATEX**. Smooth, resilient, heat-resistant and easily die-cut, it exhibits a minimum of "relaxation" — provides full measure of sealing for recommended service period of big Cat engines.

Each product pictured on these pages is a success. How each was developed is a story in itself. But there's one chapter common to all eight stories: That dealing with "binders" and the Coatings Department of Goodyear Chemical Division.

A binder is a solution or dispersion of a synthetic polymer in solvents or water. It may be used as the bonding agent in a non-woven fabric, as the vehicle in a masonry paint or as the base for a rug backing or a paper coating. In any case, it imparts the distinctive properties to each product shown through raw materials and services supplied by the Coatings Department.

In one binder, the material may be used with solvents and may be a member of the **PLIOLITE** family of resins. In another, it may be a dispersion of one of these resins in water, such as **PLIOLITE LATEX**. Where oil resistance is a factor, a dispersion of a nitrile rubber in water, **CHEMIGUM LATEX**, may be selected. For other



CHEMIGUM • PLIOFLEX • PLIOLITE
High Polymer Resins, Rubbers, Latexes and

THE BEST OF IMPRESSIONS are made on high-quality papers finished with clay coatings based on **PLIOLITE LATEX**. These flexible finishes provide a permanently smooth, ink-receptive surface for the finest reproductions.



5,000 PCUND TRUCK LIFT proves strength of **PLIOBOND**—the adhesive that "bonds anything to anything"—used to join halves of test coupling of 4" bar steel. **PLIOBOND** is widely used in home and industry as "all-purpose" adhesive.



that's bound to succeed

applications, a vinyl dispersion resin in the form of **PLIOVIC LATEX** may be called for. Or the material may be **PLIOBOND**, a prepared adhesive of unusual versatility and strength.

Regardless of the material involved, the services are the same—complete and competent. The Coatings Department was organized specifically to assure the type of technical service needed for proper use of its products. Such service includes thoroughly trained sales representatives, extensive sales service laboratories and continuing research and development programs.

If you are looking for a product requiring a binder that's bound to succeed, look to the Coatings Department. The materials and help you need await your call. Just write to:

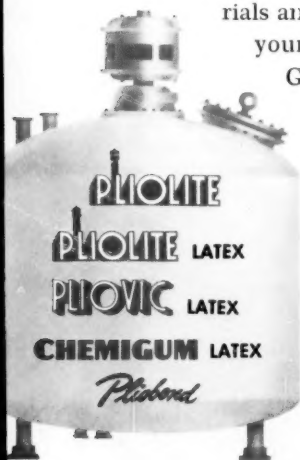
Goodyear, Chemical
Division, Dept.
U-9417, Akron 16,
Ohio.



MASONRY PAINTS THAT BREATHE, and live longer for it, are made with **PLIOLITE S-5**. They last up to 20 times longer than other paints because they are unaffected by alkalis and moisture, resist sunlight and weathering, provide a breathing-type water repellency.



MADE WITHOUT LOOMS are new, non-woven fabrics. **CHEMIGUM LATEX** is used in the bonding agent to lock random fibers in place. Smooth, porous mat of high multidirectional strength is ideally suited for reinforcing plastic upholstery sheeting.




Chemigum, PlioBond, Plioflex,
Pliolite, Plio-Tuf, Pliovic—
T.M.'s The Goodyear Tire &
Rubber Company, Akron, Ohio

PLIO-TUF • PLIOVIC • WING-CHEMICALS

Related Chemicals for the Process Industries

more than sugar



"NATURE GIVES TO LIFE
ALL THINGS ESSENTIAL TO IT
... TO UTILIZE, MAN NEEDS ONLY
TO DISCOVER THEM."

comes from the sugar beet crop

Here, within the sugar beet, nature grows and stores many of the essential ingredients that sustain and energize life itself . . . the amazing amino acids. And International harvests these and related

nutrients, often described as Nature's building blocks of health, which stem from the sugar beet.

Pharmaceutical manufacturers and industrial chemists are finding many uses for these products:

L-GLUTAMIC ACID, 99+%—A major constituent of all protein, and concentrated in brain and gland tissue, this amino acid has an integral part in many metabolic processes. It is used medicinally in pediatric and geriatric specialties, and in nutritional supplement products.

Industrially, L-Glutamic Acid is an inexpensive L-amino acid source, which has valuable properties as an intermediate and resolving agent.

L-GLUTAMIC ACID HYDROCHLORIDE, N. F.—Used medicinally as an acidulant and potentiating agent, this product has proven to be superior to any other hydrochloric acid source.

Industrially, the property of the liberation of hydrochloric acid from a solid, odorless, organic combination is used in bonding and soldering operations.

L-GLUTAMINE, 99+%—Processed from L-Glutamic Acid, our L-Glutamine is of uniform high purity and low ash. It is an important ingredient of growth media, such as

used in vaccine manufacture. A number of clinical studies are indicating the value of L-Glutamine as a therapeutic to correct nutritional deficiencies.

MONOPOTASSIUM L-GLUTAMATE, 99+%—This product is ideal for seasoning dietary foods, and as a substitute for products containing sodium. It has a salty taste, and enhances natural food flavors. There are additional uses in the medicinal and veterinary fields.

MONOSODIUM L-GLUTAMATE, 99+%—Our brand, Ac'cent*, is enjoying world-wide use as a seasoning and flavor-enhancing agent. Research has indicated important new medicinal values for this product. These include an application in geriatric preparations, and the use of concentrated solutions of glutamate in the treatment of toxicity caused by liver disease.

ST. M. REG.



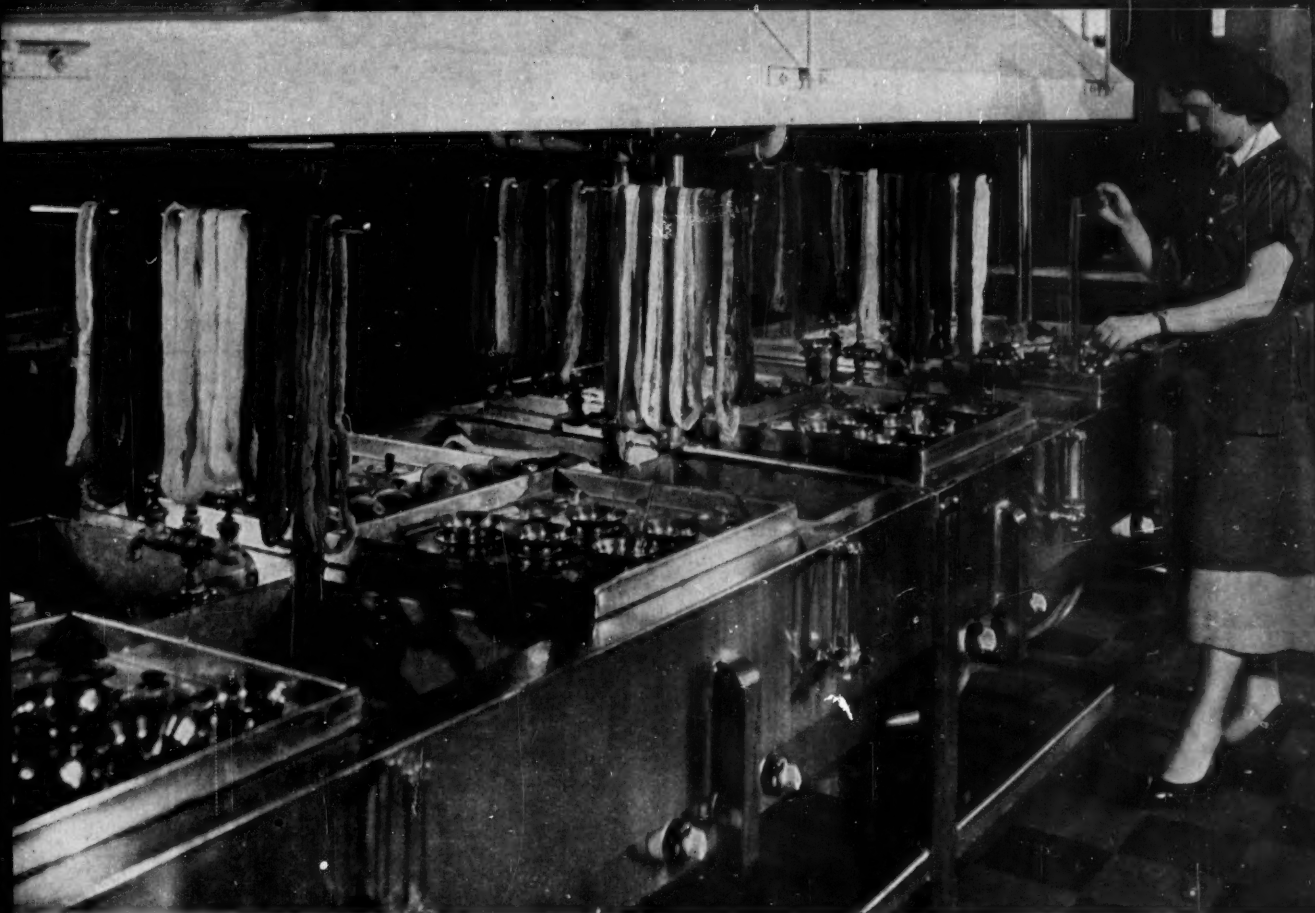
Medicinal Chemicals Dept.

Amino Products Division

INTERNATIONAL MINERALS & CHEMICAL CORPORATION
20 NORTH WACKER DRIVE, CHICAGO 6, ILLINOIS



PLANT AT SAN JOSE, CALIF. • WAREHOUSES AT CHICAGO, NEW YORK



GENERAL DYESTUFF CO.

QUEST FOR FASTNESS: It's the result of mounting textile demands for high-quality dyes.

C W Report

estimated that the textile trade consumed about 80% of the dyestuffs. Today, this figure is estimated (by *CW*) at about 70% of the total \$245-million color market. Leather, too, has changed but little, consuming about 3% of output. The paper trade, on the other hand, has been steadily increasing its use of color—from an estimated 7% in 1946 to about 10% today (see table p. 50, "Customers for Color"). The remainder of output goes into plastics, paints, petroleum, rubber, inks and other items.

Two of the most significant trends in dyes for textiles: (1) the drive to upgrade wearing apparel by using non-fading, wash-fast colors; and (2) cutting costs through cheaper dyes to meet

competition in the cutthroat textile market. The two are diametrically opposed, for low-cost dyes generally yield inferior fastness properties. Although the pendulum swings, the long-term trend is to quality.

Guaranteeing color properties of a garment via labeling is a "hot potato" at the moment. Many attempts have been made to associate brand labels with fastness properties. Most of these have fallen by the wayside. Part of the trouble resides in lack of agreement between the color manufacturer and the apparel fabricator, with the dye house caught in the middle.

Unquestionably, the dye industry can specify dyes satisfactory for any end-use within reason. But the increased cost that would result from application of superior colors does not always fit the low-priced clothing manufacturer's budget. In turn, the cost-cutting is passed on to the dyer and finisher who operates at a very low margin of profit. Chronically distressed textile producers must meet all domestic competition as well as that of low-priced foreign goods.

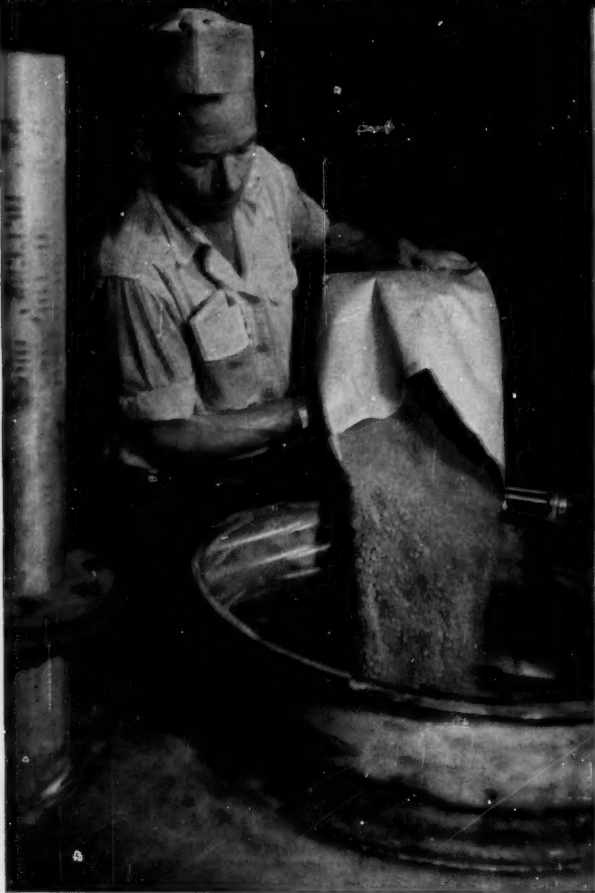
A way out of this dilemma is to place a label describing dye-fastness on every item of clothing. This action, along with customer education, represents a solution, the success of which will depend on the support of all parts of the industry. And enthusiasm for the plan is far from unanimous.

Cotton: Cotton, still easily king of all textiles (65% textile dollar sales), and viscose rayon (about 10%), using the same type of dyes, take the majority of all dye output—directs, vats, sulfurs, azoics and basics. These colors have found very limited use in wool, acetate and the newer synthetics.

In cotton and viscose dyeing, much attention has been given to high-speed continuous application of colors with the consequent decrease in unit costs. Vats and sulfurs are most prominent in this development.

Vats, as a class, give the top all-around fastness properties. It follows then that vat dyes are required in order to guarantee the best resistance to washing in home or commercial laundries.

The use of strong bleaching agents,



LITTLE GOES FAR: For 4,000 sq. ft. of paper, 3 lbs. of dye.

DU PONT CO.

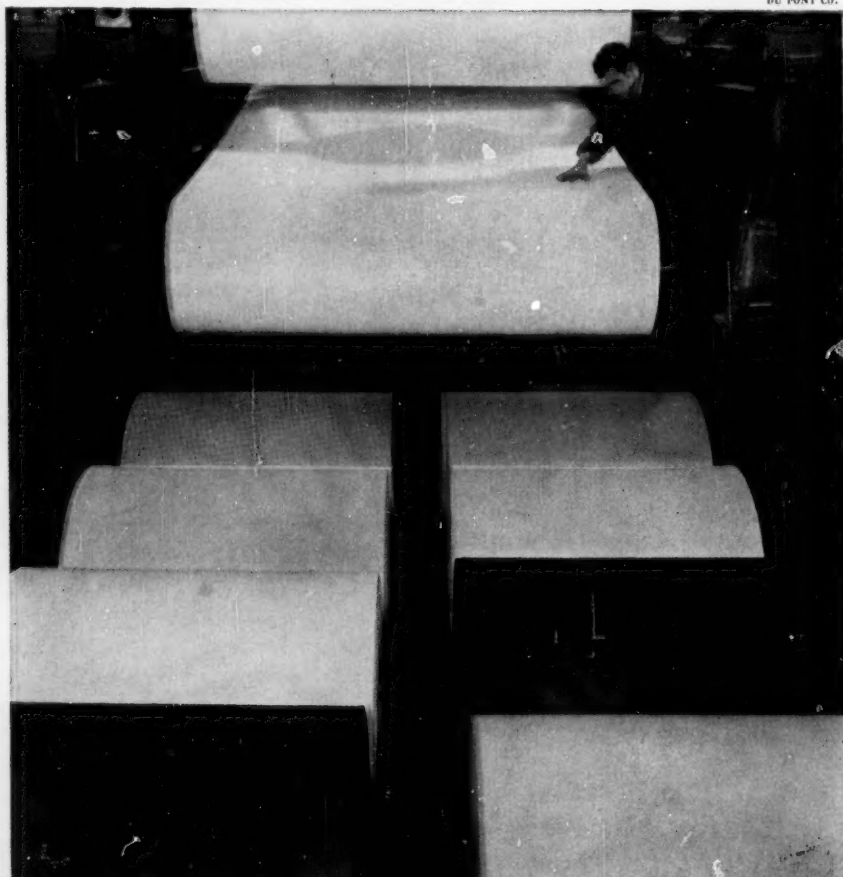
moreover, is widespread in commercial and home cotton laundering. These oxidizing chemicals make rough going for dyes. Vats, again, as a class, are the best under these vigorous conditions. Where these end-use conditions are not met and cost is important, direct colors may be the preferred choice.

Specific needs in the vat field: (1) a light-fast bright yellow; (2) a light-fast bleach-fast bright blue; and (3) a bright light-fast vat red.

Acetate: Many of acetate rayon's dyeing troubles have been eliminated by spin dyeing. Most of the fiber, however, is still dyed from water in a conventional manner. Several improvements have been made in dyes to upgrade wash-fastness for this fiber. However, much room for researching still exists.

Wool: Though the spotlight these

SECOND BIG OUTLET: Paper ranks as the second largest market for colors. It's still a long way behind textiles, but growing faster. Coatings, plastics are also helping color producers to diversify.



DU PONT CO.

Amazing paper "stops the clock"

Wrap an edible fat, such as lard or butter, in paper *treated with Ionol®* and time will stand still. Ionol is the Shell Chemical antioxidant that gives fats a longer life. It stops the clock on spoilage.

Fat-containing food products, too, retain their flavor and aroma when protected in Ionol-treated paper. Cookies, crackers, breakfast cereals remain as tasty as they were when they first left the baking ovens.

In other fields, Ionol antioxidant extends the life of transformer and turbine oils, gasoline, rubber and plastics. Ionol is another Shell Chemical contribution to the improvement of industrial and consumer products.



Shell Chemical Corporation

Chemical Partner of Industry and Agriculture
NEW YORK



NEW AND

INTERESTING

**BORESTER® BORIC
ACID ESTERS**

- No. 21 Triisopropanolamine Borate
(extremely stable to hydrolysis)
No. 22 Triallyl Borate
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No. 24 Tri-(2, 6, 8-trimethyl-4-nonyl) Borate
(very resistant to hydrolysis)
No. 25 Methyl Metaborate
No. 26 Methyl Polyborate
No. 27 n-Butyl Metaborate
No. 28 Isopropyl Metaborate

Elemental Boron: 2 Grades
90a-92a Also some special
95a-97a grades having specific
characteristics

Technical Data Sheets and Samples on Request

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Sample				
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Bulletin				
Sample				
Elemental Boron, 90a-92a				
Elemental Boron, 95a-97a				

Name & Position _____

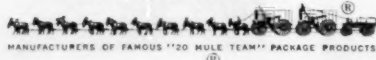
Company _____

Address _____

CW

**United States
Borax & Chemical
Corporation**

Pacific Coast Borax Company Division
100 Park Avenue, New York 17, N.Y.



days falls on premetallized azo compounds for wool dyeing, directs, vats, sulfurs, azoics and basics still find application—albeit limited.

The newer premetallized compounds are coming up fast, not only for wool dyeing but also for nylon dyeing.

Recent successes with these compounds boils down to this: by using premetallized azo compounds, wool is dyed under almost neutral conditions. Formerly acid pH's were needed. In shifting to neutral baths, dyers produce softer, more uniformly dyed wool than could be obtained using acid dyes.

Besides, wool so dyed turns out with top light-fast, wash-fast properties—always important considerations to dye manufacturer, dye house and apparel fabricator.

Though their commercial development is comparatively new, sales volume is growing apace (\$100,000 worth of premetallized dyes are estimated to have been sold in 1950; \$1 million in 1956). Some color producers currently sparking this development in the U.S. are: Geigy, Du Pont, GAF, CIBA. They're looking for premetallized azo dye production to reach \$2.5 million by 1960.

Newer Synthetics: Most of the concern of the textile trade is concentrated on dyeing the newer synthetics and blends of natural fibers with the synthetics. Many of the problems have been solved, but new ones crop up with the introduction of each new fiber.

Polyamide dyeing has become fairly routine with a wide selection of acetate rayon colors and wool dyes to choose from.

Acrylics (Orlon, Acrilan) have been more troublesome to dye in fast colors. Some success has been obtained through use of selected acid colors and acetate rayon dyes. Certain basic colors (like Du Pont's Sevron, GAF's Genacryl) recently introduced produce brilliant shades, with fairly good fastness properties. General Aniline & Film pioneered in this application. A fiber that could be dyed simply with vat dye fastness is needed in the acrylic field.

Polyester dyeing is considered difficult at best. For satisfactory dyeing, a carrier such as *o*-phenylphenol or benzoic acid is needed, along with accurate control. Alternately, some success has been obtained under pres-

C W Report

surized conditions at 250 F. The volume use of polyesters (and acrylics) is in blends with wool and cellulose. In these constructions, the dry cleaning and sublimation fastness of many dyes leave much to be desired.

Textile Pigments

In textiles, pigments have surged fastest in printing. Dyes formerly dominated this field. However, tailor-made resins have been developed, along with processes that bond the insoluble colored pigment to the cloth. The problem of rubbing off or "crocking" has limited these applications in previous years but has been to a large extent overcome sufficiently to meet end-use requirements. Some leaders in pigment printing are Interchemical, Sherwin-Williams and Imperial. In textile printing, pigments and dyes share the total dollar business about equally.

Solid shades of color involving tremendous yardages of cloth have been conventionally put on with dyestuffs. However, resin-pigment concerns have recently been eyeing this profitable market. Although very small at present, in terms of total market, it could seriously affect dyestuff manufacturers who were not also grounded in pigments. Some prognosticators in the trade do not see the threat to dyes carrying very far because of crocking and somewhat inferior wash-fastness—especially in the heavier shades. Other authorities point to the lower cost of the pigment-resin method and predict a dominating position for it eventually. The battle between the two is sure to highlight the textile field's activities in the next five years.

An exciting new mass market for pigment manufacturers lies in the spindyeing field. Coloring the textile dope prior to spinning is not new. Manufacturers in the U.S. had previously stayed away from it because of their fear of being caught with large inventories of unsellable shades. To make spun-dyed man-made fibers, large

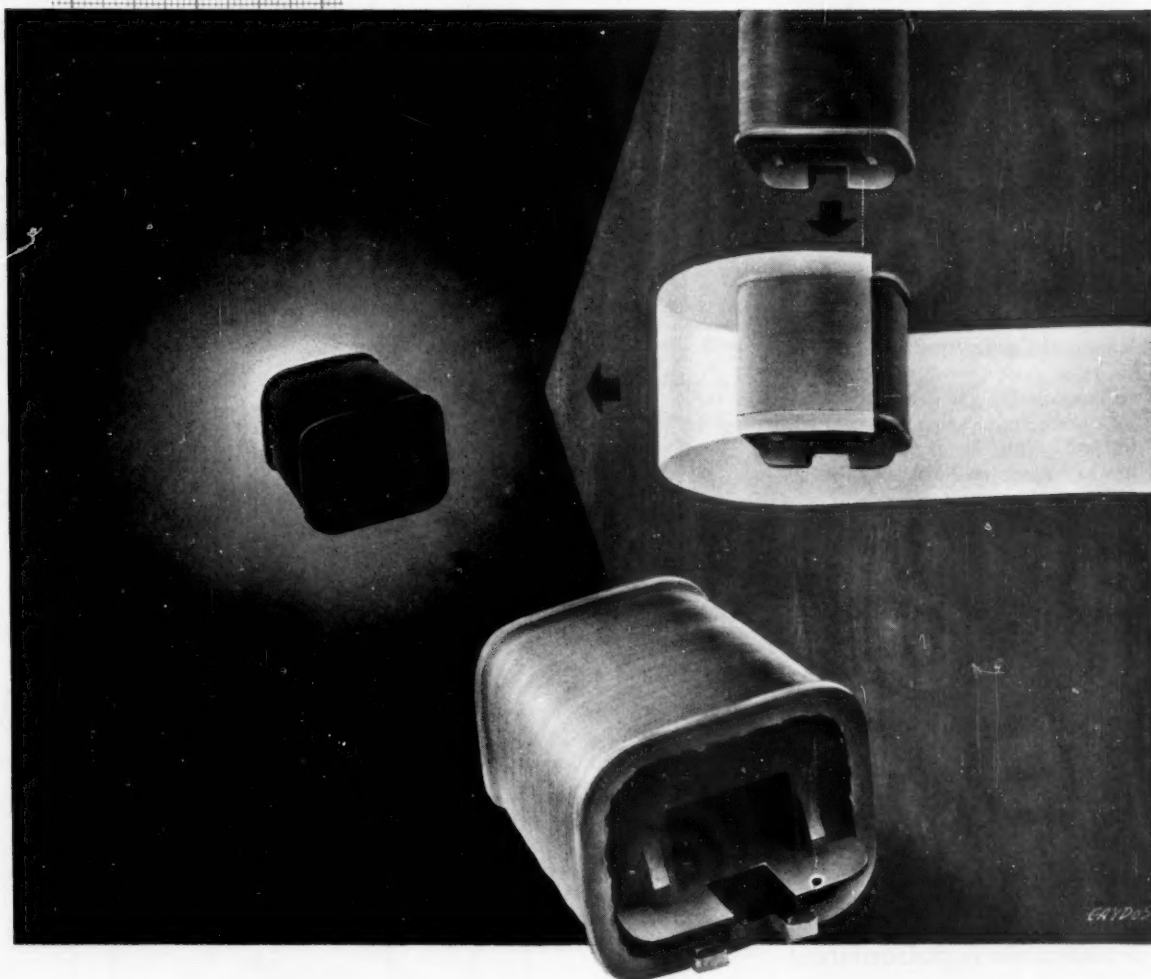
Another example of



**CHEMICAL
PROGRESS**

Q. Could chemical science create a non-melting material that would shrink and bond under heat, for insulating and other applications?

**A. NEW IRRADIATED PLASTIC
SHRINKS...TO DO A BETTER JOB**



It's called **Irrathene®** irradiated polyethylene—this new plastic created by bombarding polyethylene with high-energy electrons. A result of General Electric advances in radiation chemistry, this *non-melting* polyethylene film is ideal for "encapsulation" applications. It shrinks under heat to form a tight, tough, form-fitting protective sheath.

The electrical industry is among the first to utilize Irrathene irradiated polyethylene. Wrapped around coils, as shown above, it heat-shrinks and bonds to press out air pockets, seal out moisture, provide tough, space-saving, low-cost insulation.

Beyond the electrical field, the industrial potential of

Irrathene film is tremendous—as sterilizable containers, cookable food packages—dozens of new uses awaiting only American ingenuity.

This is progress for all, through G-E chemical progress.

How can Irrathene irradiated polyethylene help your business? For more information, write Department CDD, CHEMICAL AND METALLURGICAL DIVISION, General Electric Company, One Plastics Avenue, Pittsfield, Mass.

Progress Is Our Most Important Product

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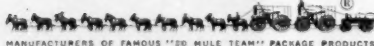
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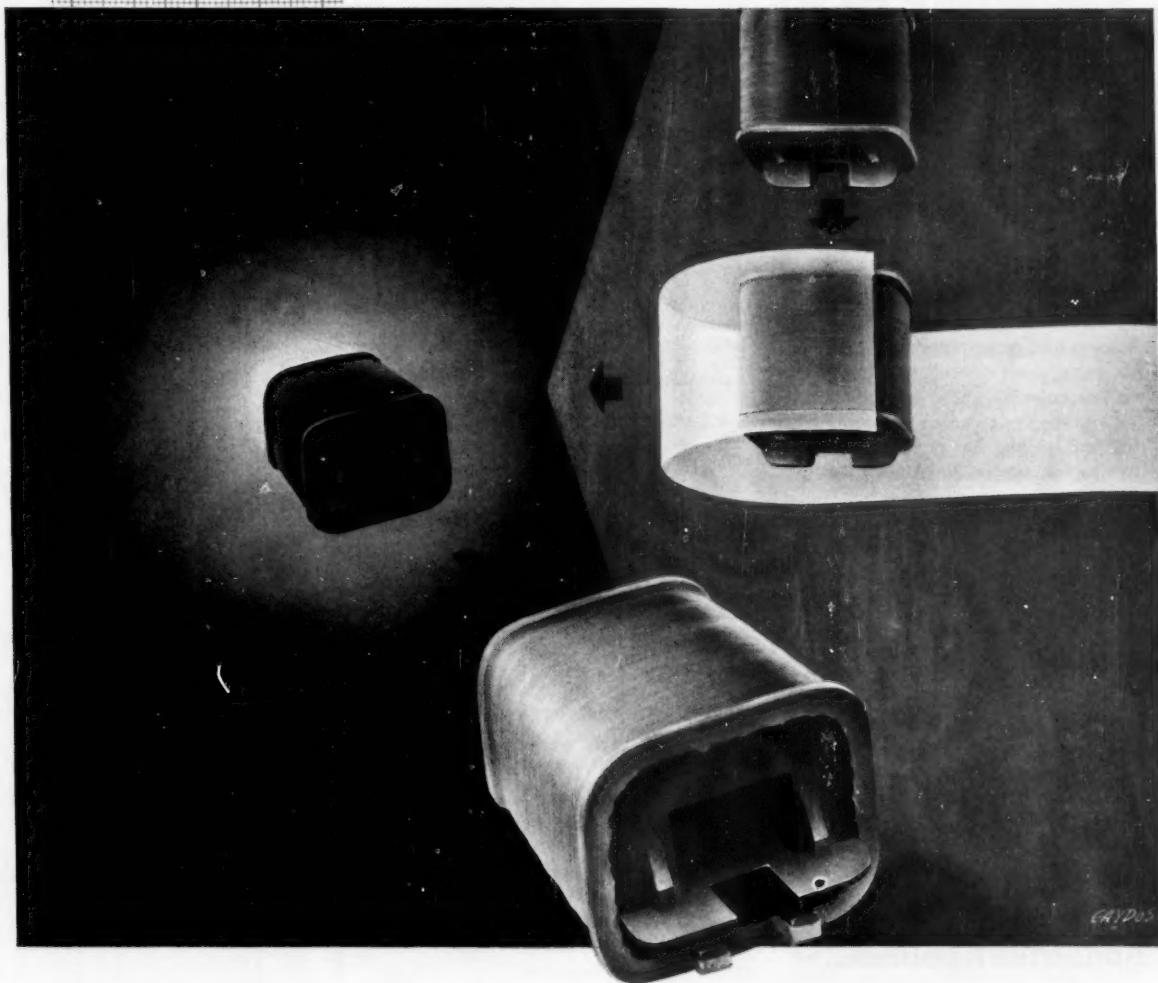
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Q. Could chemical science create a non-melting material that would shrink and bond under heat, for insulating and other applications?

**A. NEW IRRADIATED PLASTIC
SHRINKS...TO DO A BETTER JOB**



It's called **Irrathene®** irradiated polyethylene — this new plastic created by bombarding polyethylene with high-energy electrons. A result of General Electric advances in radiation chemistry, this *non-melting* polyethylene film is ideal for "encapsulation" applications. It shrinks under heat to form a tight, tough, form-fitting protective sheath.

The electrical industry is among the first to utilize Irrathene irradiated polyethylene. Wrapped around coils, as shown above, it heat-shrinks and bonds to press out air pockets, seal out moisture, provide tough, space-saving, low-cost insulation.

Beyond the electrical field, the industrial potential of

Irrathene film is tremendous—as sterilizable containers, cookable food packages—dozens of new uses awaiting only American ingenuity.

This is progress for all, through G-E chemical progress.

How can Irrathene irradiated polyethylene help *your* business? For more information, write *Department CDD, CHEMICAL AND METALLURGICAL DIVISION, General Electric Company, One Plastics Avenue, Pittsfield, Mass.*

Progress Is Our Most Important Product

GENERAL  ELECTRIC

yardages have to be run before the method can be considered economical. These runs can be made in only a limited number of shades for the stylists to choose from. This lack of flexibility has until recently been thought to be an insurmountable barrier. Nevertheless, a number of plus values have been on the side of the pigment spun-dyed goods. Acetate rayon firms in particular have found it a way to upgrade their material to meet the challenge of the better wash-fastness advertised by the cellulose.

Seriously considering spin dyeing with pigments are manufacturers of the newer synthetics. Du Pont has limited production on the market in spun-dyed nylon. It is rumored that Chemstrand will shortly follow suit. Polyester and polyacrylonitrile may come later in spun-dyed shades.

Contrasted with acetate rayon and viscose, the newer synthetics are considerably more difficult to spin-dye. In acetate coloring, the pigment is added to acetone dope, which solvent—with its low boiling point and relatively low solvent power—does not affect the pigment. Viscose and Bemberg offer no great problem, for the system is aqueous. On the other hand, better solvents and higher temperatures must be used to spin-dye the acrylics, polyesters and polyamides. Still higher temperatures obtain in melt-spun processes. These methods allow a very limited selection of pigments, which do not dissolve, agglomerate or decompose because of heat.

How far spin dyeing will go in terms of total textiles colored is anyone's guess. Some experts say: 30% of all acetates produced will be spun-dyed; less viscose fibers will be colored this way; much less newer synthetics.

Nontextile Applications

In the past five years, dyestuff production and sales have taken some erratic turns (CW estimates 1956 dye production will be down some 10%; sales down 8.8%). Organic color producers trace this spotty growth to: (1) textile industry vicissitudes; (2) increasing imports of dyes and finished textiles; (3) decreasing demand for U.S. dyes abroad.

Output of dyes and pigments for nontextile uses, however, is steadily expanding. Recognizing opportunities to diversify their production, U.S.

Company	Acetate	Lake	Azoic	Acid
Allied Chemical & Dye Corp.	Nacelan	Iosol, Fluorosol	Naccogene	Alphazurine, Chromolan, Durol
Althouse Chemical Co.				Nydye, Nylanthren, Supernylite
American Aniline Products, Inc.	Amacel			Amacid, Amalan, Lockavin
American Cyanamid Co.		Spirit Dybryte, Calcophen	Calcozoic, Naphthosol, Calconyl	Calcocid, Calcofast, Quinisol
Arnold, Hoffman & Co., Inc.				Aheoquinone, Synthracene
Augusta Chemical Co.			Naf-Sol	Bixacid, Bixasol
Bick Chemical Corp.				Kiton, Neolan, Neonyl, Cibalan
Carbic-Moss Corp.				Cephracyl, Chromac, Pontacyl, Roracyl
CIBA Co. Inc.	Cibacete			
Du Pont	Acetamine, Celanthrene, Latyl	Rotalin Luxol	Diagen, Naphthanil	
Dye Specialties, Inc.		Hectolene		
Eastman Chemical	Eastone Setacyl			Erio Gycolan, Pol Setacyl, Erioglauc
Geigy Chemical Corp.				Alphanol, Anthral
General Aniline & Film Corp.	Cellitazol, Celliton	Azosol, Hansa, Resoform	Rapidogen, Variamine	Astracel, Astrol, A Fuchsin, Azo Phl ine, Irisol, Sulpho Supralan, Rubin Supramine, Viola ine, Igenal, Palatin Erganil, Supranol
Hilton-Davis Chemical Co.			Hiltonil, Hiltosal, Spectrolene, Hiltol-naphthol Arigen	Hidacid
Interchemical Corp.				
John Campbell & Co., Inc.	Camacyl			Aceko, Ethonic, Lavosal
Metro-Atlantic, Inc.				
Nova Chemical Corp.			Metrogen Novagen	Comacid, Metamine Nyasol
Nyanza Color & Chemical Co., Inc.				
Otto B. May, Inc.			Pharmol, Pharmasol	Pharmacine
Pharma Chemical Corp.				Apocid
Poughkeepsie Dyestuff Corp.				
Sandoz Chemical Works, Inc.	Artisil Diazo, Artisil			Vitrolan, Xylene M ing, Lanasyne
Southern Dyestuff Corp.				
Zinsser Div., Harshaw	Celutate			

color firms are welcoming such markets as paper, leather, coatings, plastics and detergents.

Currently, dye producers regard the paper industry as a most promising area in which to expand nontextile color sales. Reasons for this thinking are easily apparent. Paper production is rising at breakneck speeds. Paper marketers are turning to color as a means of outflanking competition.

One recent survey shows that dye

sales to paper and paper product markets have already reached a rough minimum of \$17.5 million (it was only \$8 million in 1946).

Colored tissue and toweling are the big uses for paper dyes. Dyeing paper board for point-of-sale shipping containers is another fertile outlet for dyes currently being eyed by color producers. In other areas, paper firms are pushing colored (and printed) multiwall bags as advertising aids.

Trademarks by Tariff Commission class

Vat	Mordant	Sulfur	Basic	Direct
anthrene, Solvat, Sulfindone	Alizarol, Buffalo, Serichrome, Super- chrome	Sulfindone		Diazine, Erie, Erieform, Ni- agara, Solantine
anthosol, Amanthrene colloid, Calcosol	Chromaven Calcochrome	Calcogene	Calcozine, Dybryte	Azoanthrene, Superlitefast, Vegentine Amanil, Formanil
covat	Bixachrome			Calcodur, Calcofluor, Calco- form, Pheno, Calcomine
digosol banone, Ciba, Indigene, Midland ucogene, Leu- cosol, Sulfan- threne, Ponsol	Pontachrome	Pyrogene Sulfogene	Sevron	Bixaform, Bixamine
non	Eriochrome	Eclipse	Seto	Cupranil, Indigene, Melanither- ine, Chlorantine Fast, Rosan- threne, Uvitex, Coprantine Pontamine, Seristan
gol, Algosol, Helindon, Hydrol Indanthrene	Chromin- digen, Chromo- gene, Chromo- xane	Immedial, Indo Carbon, Katigen	Cyper, Fla- vophos- phine, Nile, Rhoduline	Tinopal, Diazophenyl, Poly- phenyl, Solephenyl Benzo Brown, Benzofix, Benzo- form, Blancophor, Pluto, Dia- zanil, Fastusol, Thiazol Yel- low, Dianil
	Hidachrome		Hidaco	
	Kromeke	Amalthion		Interchem Amidine, Formadine, Solami- dine
etrovat vanthrene				Nyaform, Nyanza, Trianol
ayvat				Apomine
	Apochrome, Aposide, Palizarine Metomega Chrome, Omega Chrome	Thional So-Dye-Sul		Chloramine, Viscoform, Cupro- fix, Trisulfon, Pyrazol Fast, Leucophor, Diazamine, Visco, Lumicrease

Basic dyes lead all the rest in paper coloring. Users find them inexpensive to apply, giving bright tints. Big-volume basics for paper these days are such dyes as auramine, chrysoidine and Bismarck Brown.

Acid dye producers are being favored with some of the paper color business, too. Acid dye use, however, is more restricted than basic dye use because acids lack affinity for bleached cellulose. On the other hand, acid

dyes are finding outlets in surface-dyeing of paper board and heavy-weight papers.

Along with the basic and acid colors, directs are making inroads in the paper trade. Though directs are high-priced (and generally impart dull shades), their natural affinity for cellulose makes expanded use of them look promising.

Paper producers are especially inclined to favor direct dyes because

these overcome the paper dyeing problem known as "two-sidedness." Some dyes won't color paper uniformly on both sides. With the advent of high-speed paper machines, this dye shortcoming is magnified. Directs are beating down opposition on this score.

Pigment producers are needling dyes to a small degree in coloring paper. Where paper or board is to be light-exposed for any length of time, pigments (like the phthalocyanines) are used for light fastness. One of their latest showings in paper has been in twisted paper fabrics for automobile interiors.

Coatings: In the race to find bright, light-fast colors for products exposed to sun and weather—exterior coating, for example—organic pigments are taking a decided lead over dyes.

In automobile coatings, as in paints, bright pastel shades are ascendant. If stylists are correct, this trend to pastel coatings will not reverse itself soon.

For coatings, light-fastness throughout is the cardinal specification for color producers to meet. Phthalo green and blue pigments have already proved their worth on this score.

Other pigment shades (like red, yellow and orange, particularly) are at best somewhat inferior to the phthalos in light-fastness. Car owners who have watched their car's light-colored paint job fade can attest to this.

For these tricky shades, paint and lacquer manufacturers are turning to more complicated chemical structures, such as vat dyes (used as pigments), to attain the desired fastness results. High price has dampened widespread use of these as coating pigments. And even among the vats, light-fast bright yellows and reds have yet to be attained by dye researchers.

When automobile coating manufacturers realize that vats are the best synthetic colors available to them at the moment for producing troublesome shades, vat dyes will find a firmer footing in that market.

Producers of exterior house paints are also clamoring for pigments resistant to light degradation. Masonry paints (many are colored) employing PVA and acrylic latices, among others, are gaining wide acceptance. In addition to light-fastness, organic pigments for this use must be heat-stable, resistant to flocculation and solvent bleeding in whatever latices the manufacturer uses. And while a pigment

may show excellent light-fastness in, say, an automotive alkyd-based coating, it may be entirely unsatisfactory in a masonry paint using an acrylic resin latex—and vice versa.

Meanwhile, a good many pigment manufacturers are speeding research in the coating field to meet the demands of this growing market for organic color. There's much to keep them occupied before they clear some of the hurdles.

Plastics: As it grows, the giant plas-

tics industry will be consuming ever increasing tonnages of color. That's particularly true in view of current decorator trends to using spectrums of colors in place of black and white in so many finished plastic products.

Each plastic demands its own particular requirements from pigments. In addition to ordinary fastness requirements of light- and heat-stability, plastic manufacturers specify high pigment dispersibility in their compositions. At present, over-all consumption of dyes and pigments by the plastics industry is small. Growth potential, on the other hand, is solid.

Fluorescent Dyes: Recently, fluorescent dyes have been making an important stand in the industry. These new dye products are gaining footholds in detergent, textile and paper markets. Right now, it's estimated that 90% of their dollar sales (about \$7 million/year worth) are household detergents

and textiles. The remaining 10% goes to the paper trades.

In effect, they're used for making off-shade whites whiter by "optical" bleaching, absorbing invisible ultraviolet light and emitting this as white light.

Most of these fluorescent dyes are derivatives of diamino stilbene sulfonic acids, are being produced by such chemical firms as American Cyanamid, Du Pont, General Aniline & Film, CIBA and Geigy.

Leather Dyeing: In expanding the nontextile uses for color, producers are finding a booming market among leather goods manufacturers. They're eager to sell more and more dyed shoes, jackets, luggage, women's accessories. Leather industries now consume about \$8 million/year worth of dyes, but dye producers are counting on this figure to grow as colored leather style trends gather momentum.

WHO MAKE PIGMENTS?

These firms account for virtually 100% of U.S. synthetic organic pigment output.*

Ad-Co Color Corp. (Newark, N.J.)
Allied Chemical & Dye Corp. (New York)
American Cyanamid Co. (New York)
Ansbacher-Siegle Corp. (Staten Island, N.Y.)
Appleton Coated Paper Co. (Appleton, Wis.) †
Arnold, Hoffman & Co., Inc. (Providence, R.I.)
California Ink Co., Inc. (San Francisco)
Childs Pulp Colors, Inc. (Brooklyn, N.Y.)
CIBA Co., Inc. (New York)
Cincinnati Chemical Works, Inc. (Cincinnati)
Collway Colors, Inc. (Paterson, N.J.)
E. I. du Pont de Nemours & Co., Inc.
 (Wilmington, Del.)
Dye Specialties Corp., Inc. (Jersey City, N.J.)
J. S. & W. R. Eakins, Inc. (Brooklyn, N.Y.)
Federal Color Laboratories, Inc. (Norwood, O.)
Fine Colors Co. (Paterson, N.J.)
General Aniline & Film Corp. (New York)
B. F. Goodrich Co. (Akron)
Guyan Color & Chemical Works
 (Huntington, W. Va.)
Hampden Color & Chemical Co.
 (Springfield, Mass.)
Hilton-Davis Chemical Co. (Cincinnati)
Holland Color & Chemical Co. (Holland, Mich.)
Imperial Paper & Color Corp. (Glens Falls, N.Y.)

Interchemical Corp. (New York)
Kentucky Color & Chemical Co. (Louisville)
Keystone Color Works, Inc. (York, Pa.)
H. Kohnstamm & Co., Inc. (New York)
C. Lever Co., Inc. (Philadelphia)
F. H. Levey Co., Inc. (Brooklyn, N. Y.)
Magruder Color Co., Inc. (Staten Island, N.Y.)
Max Marx Color & Chemical Co.
 (Irvington, N.J.)
Metro Dyestuff Corp. (West Warwick, R.I.)
New York Color & Chemical Co.
 (Belleville, N.J.)
Organic Chemical Corp. (Providence, R.I.)
Patent Chemicals Inc. (Paterson, N.J.)
Pittsburgh Coke & Chemical Co. (Pittsburgh)
Pittsburgh Plate Glass Co. (Pittsburgh) †
Sherwin-Williams Co. (Cleveland)
Sinclair & Valentine Co. (New York) †
Standard Ultramarine & Color Co.
 (Huntington, W. Va.)
Sun Chemical Corp. (Harrison, N.J.)
Thomasset Colors, Inc. (Newark, N.J.)
P. Uhlich & Co., Inc. (New York)
Western Dry Color Co. (Chicago)
Wilson Organic Chemicals, Inc.
 (Sayreville, N.J.)
Zinsser Division, Harshaw & Co.
 (Hastings-on-Hudson, N.Y.)

*Based on a listing by the Dry Color Manufacturers' Assn. (New York).

†Mostly captive production.

On the following pages are charts detailing production, sales, and cost figures over the past 20 years for pigments and major classes of dyes. Percent changes appear on the right of each chart.

Most synthetic colors showed tonnage production increases between 1936 and 1955...

(million pounds)

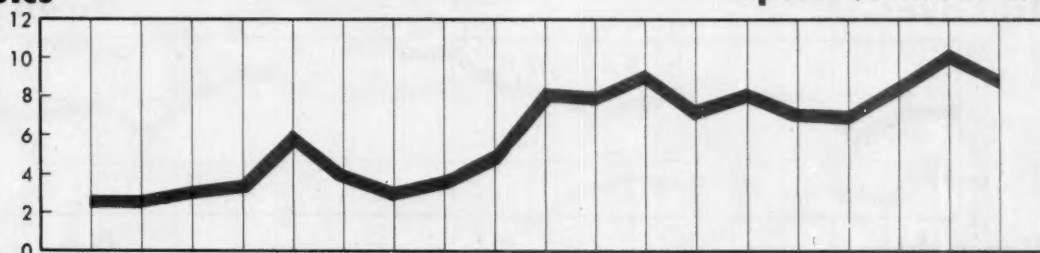
All dyes

Up 40%



Azoics

Up 233% (from '37)



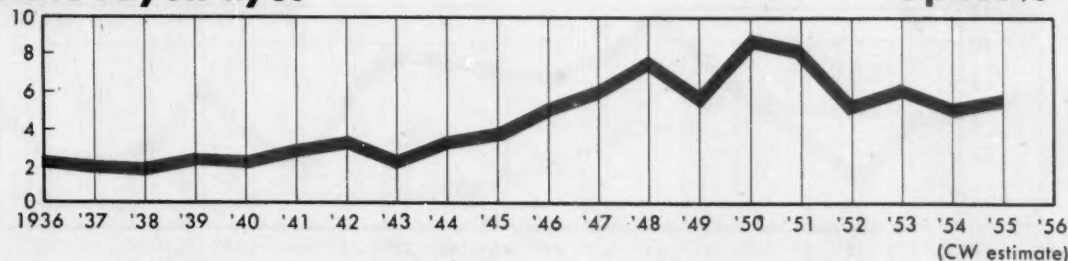
Lake and spirit soluble dyes

Up 159%



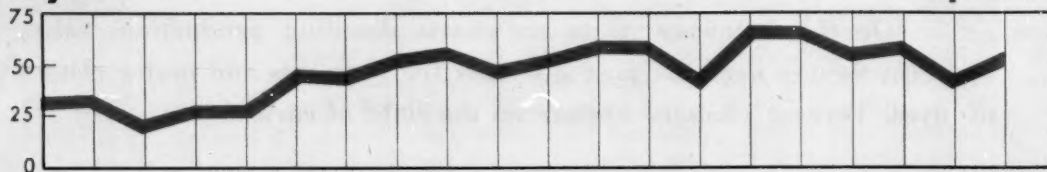
Acetate rayon dyes

Up 138%



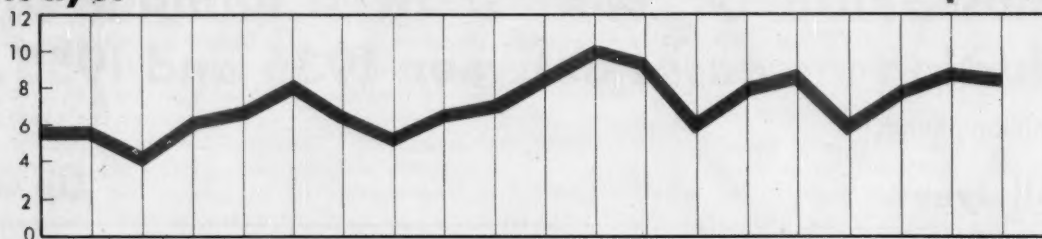
Vat Dyes

Up 61%



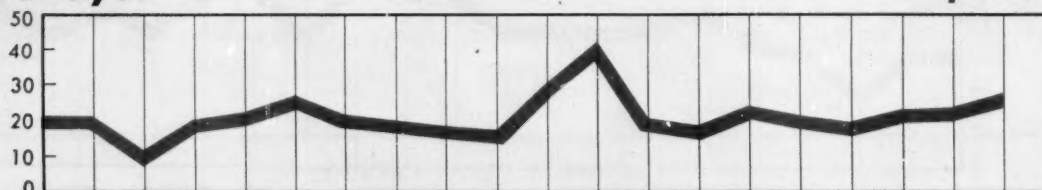
Basic dyes

Up 54%



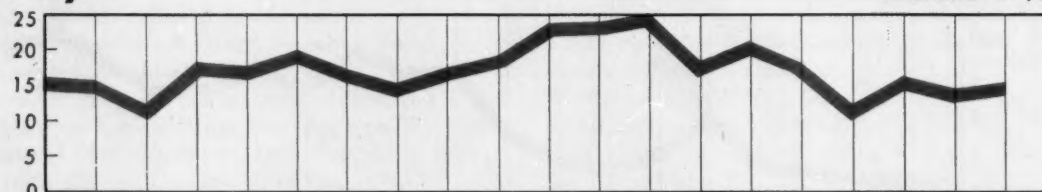
Sulfur dyes

Up 24%



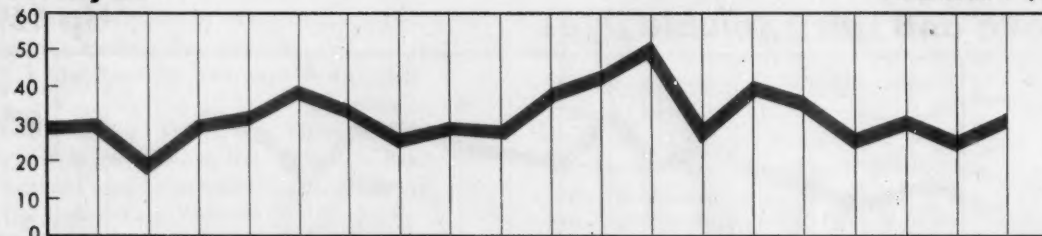
Acid dyes

Down 7%



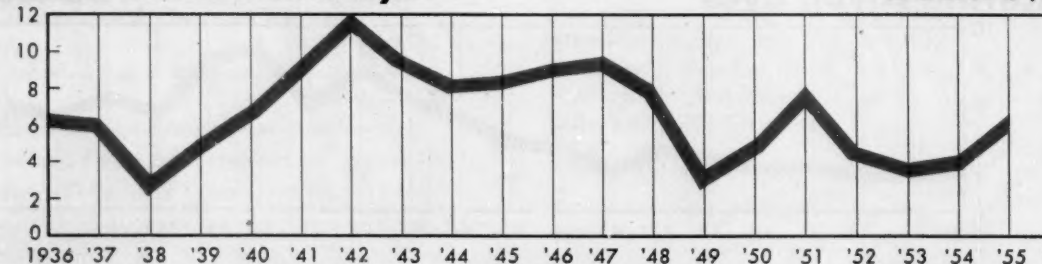
Direct dyes

Down 7%



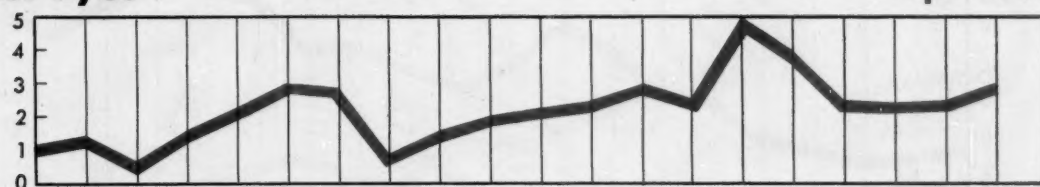
Mordant and chrome dyes

Down 3%



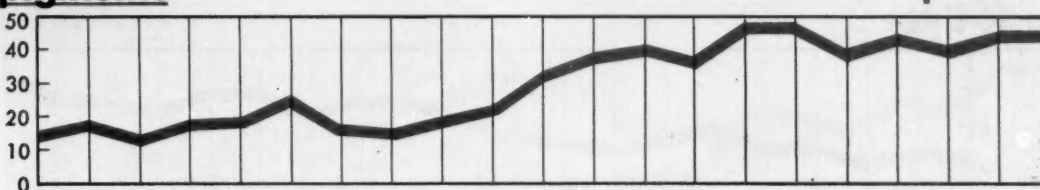
Other dyes

Up 190%



All pigments

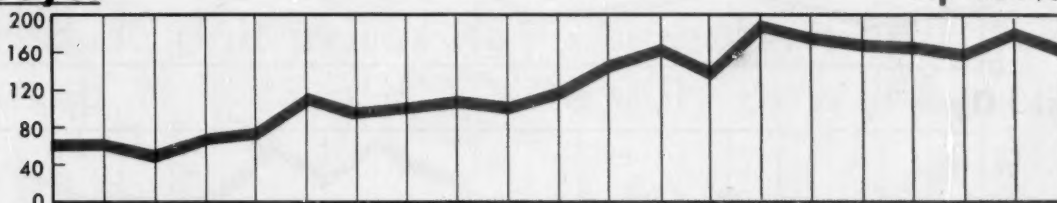
Up 189%



Over the same period, dollar sales,
(million dollars) in every case, were up ...

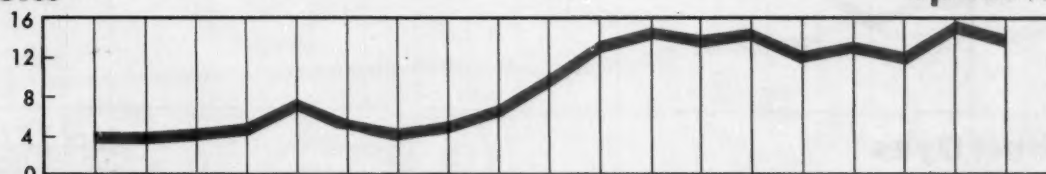
All dyes

Up 184%



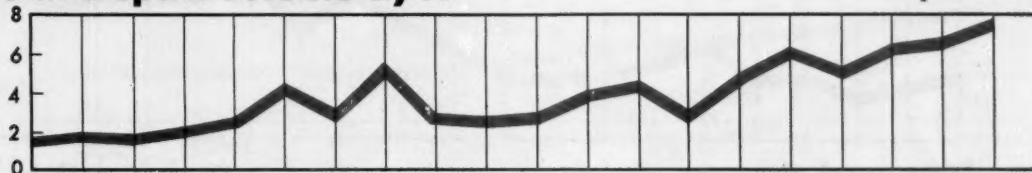
Azoics

Up 238%



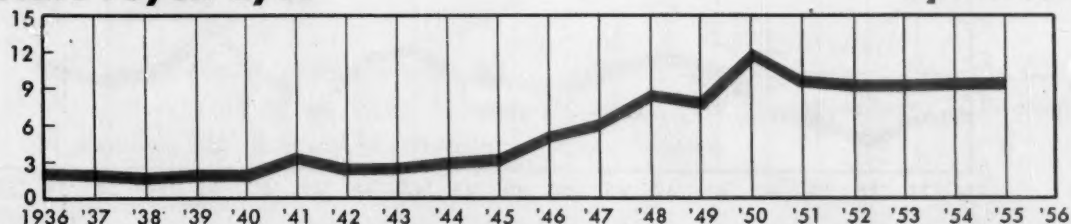
Lake and spirit soluble dyes

Up 353%



Acetate rayon dyes

Up 288%



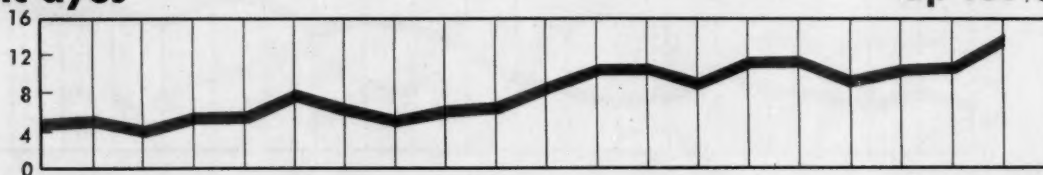
Vat dyes

Up 217%



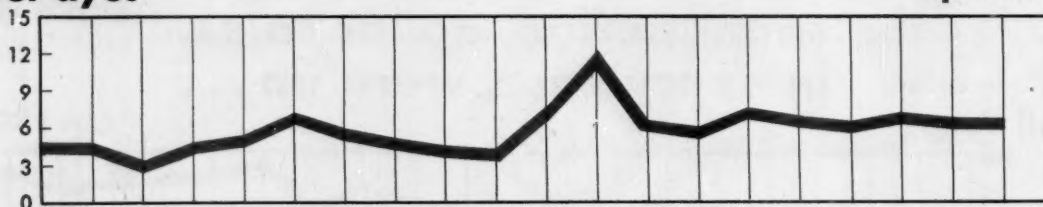
Basic dyes

Up 184%



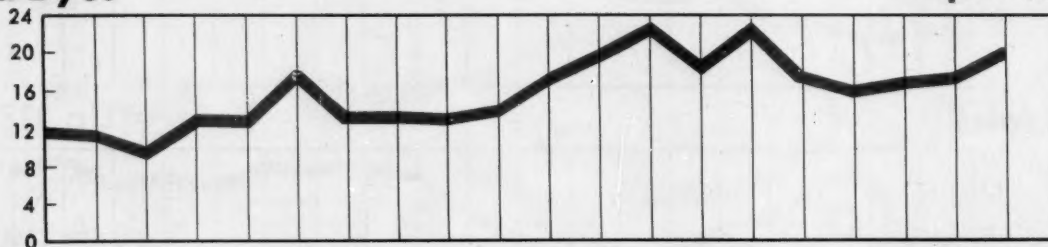
Sulfur dyes

Up 44%



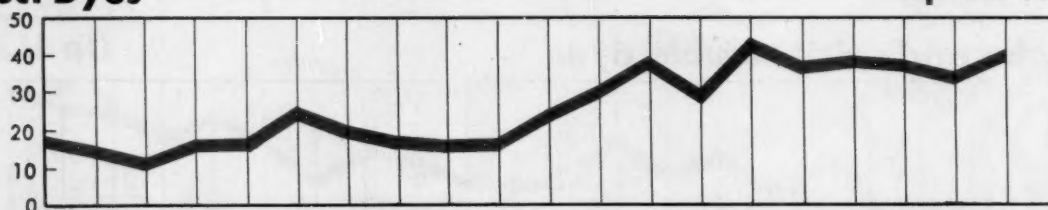
Acid Dyes

Up 71%



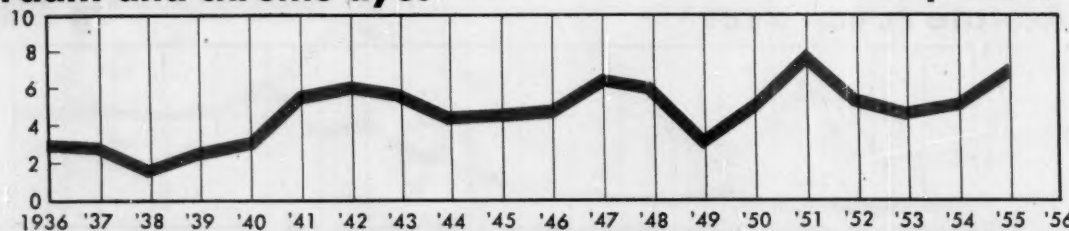
Direct Dyes

Up 137%



Mordant and chrome dyes

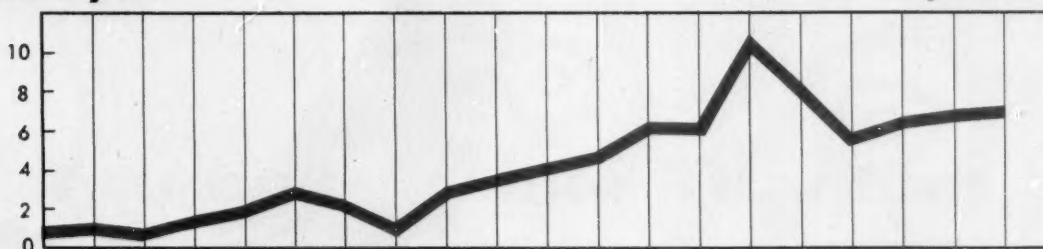
Up 135%



1936 '37 '38 '39 '40 '41 '42 '43 '44 '45 '46 '47 '48 '49 '50 '51 '52 '53 '54 '55 '56
(CW estimate)

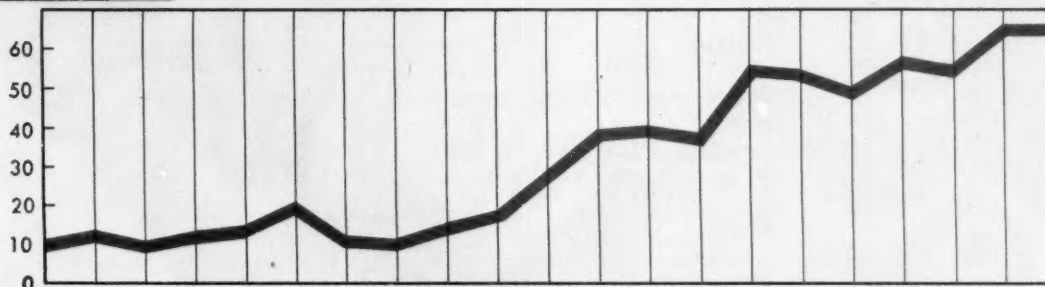
Other Dyes

Up 788%



All pigments

Up 530%

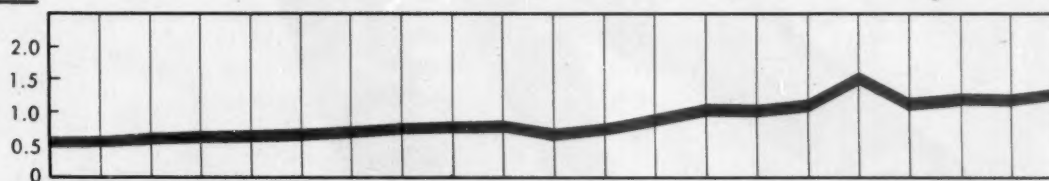


**Because unit prices have been trending
steadily upward.**

(dollars 1 pound)

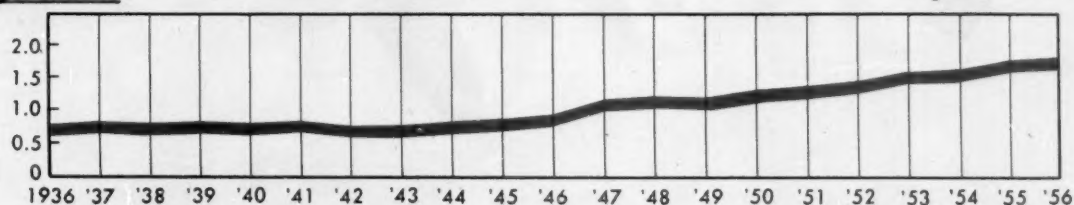
Dyes

Up 117%



Pigments

Up 125%



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Tetrachloride

Titanium
Tetrachloride

Zirconium
Tetrachloride



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target

By	the growth of nuclear power to an estimated capacity* of (millions of kilowatts)	will require reprocessing of fuel-fabrication scrap worth (millions of dollars)
1960	0.7	\$20
1965	2.9- 4.0	\$83-\$114
1970	7.2- 12.3	\$206-\$352
1975	22.6- 48.0	\$645-\$1,370
1980	54.3-137.8	\$1,550-\$3,940

*Source McKinney Panel Report, Vol 2.

Profit in the Nuclear Scrap Pile

Nuclear fuel-fabrication plants like the one shown (above, right) are opening up a real opportunity for chemical process development. By 1960, these plants will annually be turning out \$20 million worth of scrap that can't be returned directly to fuel-production operations. Chemical companies can turn this mounting scrap pile to their own advantage by coming up with an efficient uranium recovery process.

At present, scrap fuel is recovered in the fabrication plants where it is produced. Some can be recycled to intermediate stages of production, but a large part of the scrap requires external treatment to extract uranium values. With stepped-up production of nuclear fuel—and proportionately more scrap—the external recovery job will soon be more than fabricating plants can handle.

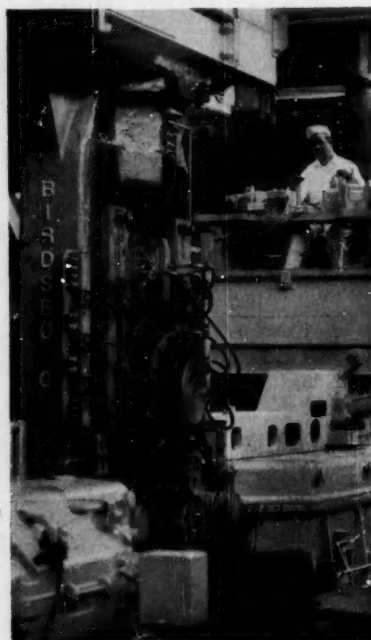
Sizable Market: Charles Manly, chief of the Policy and Program Branch of AEC's Division of Civilian Application, says the amount of reclaimable scrap is expected to increase steadily. Fuel production for power reactors due in by 1960 (total capacity, 700,000 kw.) will yield about 56.7 tons/year of external scrap valued at \$20 million. At this rate, the projected growth of nuclear power (see chart) will boost total annual scrap value to \$1.5-\$3.9 billion by 1980. Even though the dollar business for the reprocessor will likely be only a small fraction of these material values, says Manly, the field offers short-term profit-

making possibilities as well as long-term growth potential.

Versatility Required: Scrap from various plants will run the gamut from relatively pure uranium alloys and oxides to dross, floor sweepings and processing sludges—so recovery plants will have to be designed for maximum flexibility, batch operation. But since the equipment is expected to be small, the work appears to be well suited to smaller firms that seek a place in the field.

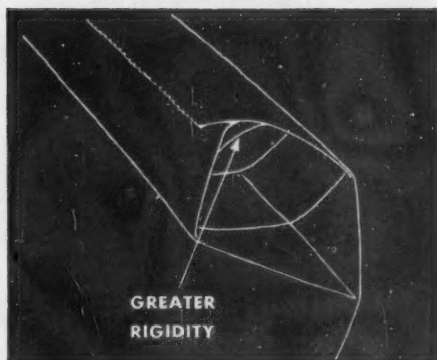
The technology required for reprocessing oxide and metallic fuels (scrap from liquid-metal and aqueous fuels can be recovered, for the most part, by internal recovery processes) has been established by AEC. It entails dissolution, separation and conversion of uranium into UF_4 that can be recycled to metallic-element manufacture or into UO_3 to be returned to oxide-element production.

By modifying existing process equipment, plants going into commercial production of fuel elements might find scrap recovery profitable. And plants developing techniques of reprocessing spent, irradiated fuel elements could investigate process unknowns in unshielded, directly maintained equipment by using fuel-fabrication scrap as a payload in pilot plants. With such a program, suggests Manly, they could gain valuable design data for "hot" processing units—and realize a profit while obtaining it.

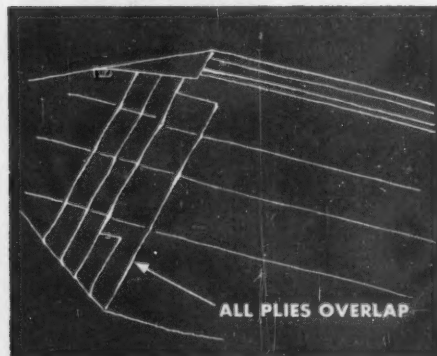


NEW! UNION BAG GIVES YOU
AN IMPROVED PACKAGE WITH THE

MOST SIFT-PROOF PASTED VALVE MULTIWALL



More functional valve corner for high-speed packers. Built-in reinforcement. Easy to handle. No insert needed.



Stepped plies in bottom construction add strength, end sifting. In the new Union Stepped End Multiwall, all plies overlap.

Reinforced stepped end bag adds strength, simplifies handling

Now—finally and completely—you can put an end to the waste, disorder, and customer dissatisfaction caused by excessive sifting and spillage. Union's new sift-proof Stepped End Multiwall gives you better performance, greater strength, and definite packaging-line savings. You get more accurate weights; cleaner plants, cars and warehousing.

EASY PLACING ON VALVE PACKER. This new Union Multiwall saves labor, maintains packers' rhythm and speed. Built-in stiffness at the valve corner speeds the feeding operation.

NO INSERT. The Union Stepped End Multiwall does not require an insert. The valve corner itself has been designed to serve as a natural insert. No catching on the valve spout.

STRONGER BOTTOM CONSTRUCTION. Stepped (or overlapped) bottom and valve construction permits every ply to overlap. The points of greatest pressure receive maximum reinforcement.

IMPROVED VALVE. The top of the valve also has been reinforced to prevent blow out and insure against breakage on the valve spout.

ASK FOR DEMONSTRATION. A Union representative will be glad to show you samples of the new Stepped End Multiwall, along with performance records.

NOW! A TRULY SIFT-PROOF MULTIWALL!

Yes, we would like to hear more. Show us how your new Stepped End Multiwall can make our packaging operation more efficient.

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COMPANY.....

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PRODUCTION

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New Look at a 'Hot' Field

One of the hotter fields of engineering technology these days is that of cryogenic engineering—production of materials at temperatures from about —190 F to absolute zero (—460 F).

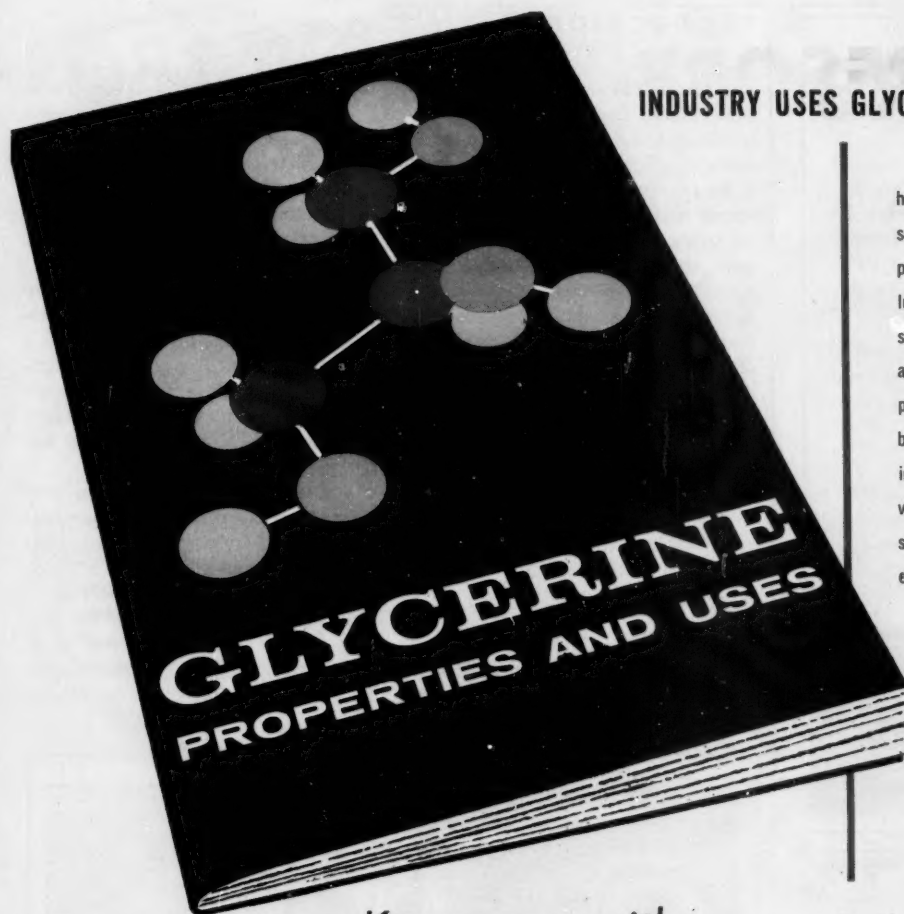
Two major reasons: the developing use for liquefied hydrogen and other gases as aircraft and missile propellants; a realization that liquefaction of gases may mean substantial savings in their commercial distribution and utilization.

Two weeks ago, well over 300 of those who are developing this new

technology got together at the National Bureau of Standards' Boulder, Colo., research laboratories—location of the largest currently producing unit for liquid hydrogen manufacture.

Both in the formal sessions of the 1956 Cryogenic Engineering Conference—which was only the second ever held—and in the informal "hashings" that followed, they agreed that cryogenics has come into its own.

There was a contrast with the first such session in '54. At that time, even the continuation of NBS low-tempera-



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PRODUCTION

ture research at Boulder was in doubt. The Atomic Energy Commission had terminated a large support contract when it discarded the "wet" liquid-hydrogen bomb idea, and NBS personnel had been told to use the meeting to try and find other jobs. But this year, the jobs were looking for the men. Many of the new jobs were with aircraft companies and missile contractors; but others were with companies with a more traditional interest in industrial gases.

Hydrogen Cynosure: Main interest, on a commercial engineering basis, however, were matters relating to production of liquid hydrogen and its storage. Highlights:

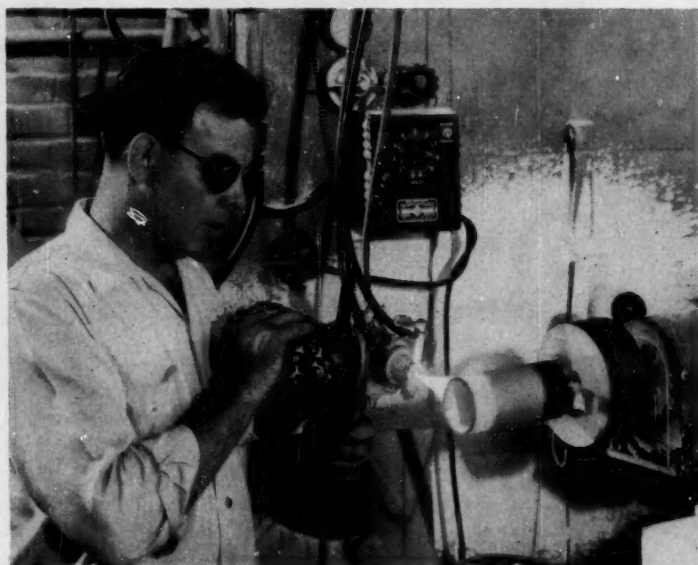
- Development, by bureau scientists, of an activated iron hydroxide gel to catalyze conversion of ortho-hydrogen into parahydrogen, the lower energy form in which the molecule's electrons revolve in opposite directions. Up to now, chromic oxide has been the

best catalyst for this conversion.

- Indication that while silica gel is the best agent quantitatively for the removal of traces of nitrogen present in hydrogen, a two-stage removal using silica and charcoal (cooled to the temperature of liquid nitrogen) may be more efficient.

- The use of oxygen-free high-conductivity copper in Dewar vacuum vessels for the storage of liquid gases is a waste of money. The cheaper electrolytic tough pitch copper commonly used in electric wiring has better thermal conductivity properties at low temperatures.

- Use of powder insulations may substantially reduce radiation heat losses. Of the materials tested, mixtures of aluminum flake with Santocel, perlite or both were especially effective. Conceivably, use of such powders may obviate Dewar vessels for applications where it is difficult to maintain the vacuum needed within the Dewar.



Reversing Abrasives' Role

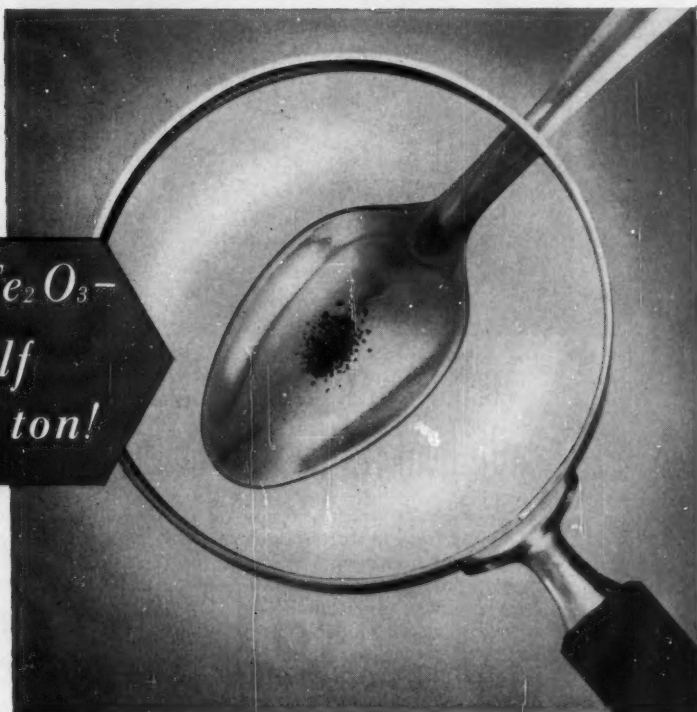
SPRAY - APPLIED industrial abrasives make good abrasion-resistant coatings. Norton Co.'s (Worcester, Mass.) new Rokide coatings—aluminum and zirconium oxides, silicon carbides—may be sprayed onto rocket and jet-engine

parts, burner components and thermocouple tubes etc., to combat high-temperature erosion. Norton will feature the process (above) at next month's Metal Congress and Exposition to take place in Cleveland.



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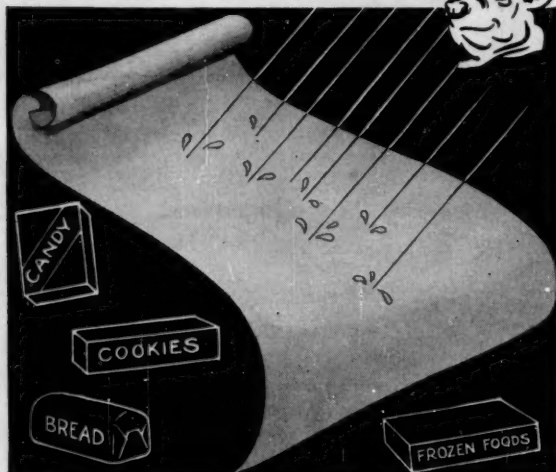
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PRODUCTION

EQUIPMENT

Process Control: Maintaining process conditions—pressure, temperature, liquid level, flow, condensate drainage—within set limits can be a major problem. But the Swiss Colony Engineering Division (Monroe, Wis.) claims its new Swisstrol electronic-hydraulic control unit will solve the control problems of most chemical processes—and with a minimum of equipment. For many applications, the entire unit, consisting of sensitive master, electronic transmitters, hydraulic valve and pump, can be mounted within a 21x11x21-in. cast-iron case. Swisstrol is said to eliminate "lag" and "hunting," speed up control, increase process accuracy.

Work Rubbers: Tingley Rubber Corp. (Rahway, N.J.) makes a new work rubber designed to fit over work shoes. Extra-high top gives added protection from splashes. Rubbers are molded in one piece, have no fabric lining, are easily turned inside out for washing. They are made in four sizes from 6 to 13, stretch to fit any work shoe. Neoprene is available for chemical service, ordinary rubber for water service.

Timing Component: A new electrical instrument timing component that continues to operate when power fails or circuits short out is produced by Industrial Timer Instruments Co. (Chicago). Spring-driven unit, held in reserve, goes into action when power failure knocks out electrically driven unit; electric unit takes over again on power resumption.

Liquid Dispenser: Morton Salt Co. (Chicago) is prepared to lease the Flocron, a new dispenser developed by Magnuson Engineers, Inc., for brine, oils and other liquids. The unit continuously circulates the flow at a constant rate, directs the stream into a container when photoelectric beam is broken. Quantity of liquid dispensed is measured by time interval set on master dial.

Pipe Caps: Stored piping, heat-exchanger tube bundles, well casing and other tubing can be protected from internal corrosion with new slipover and roll-on end caps of neoprene made by Protokap, Inc. (Houston, Tex.). A

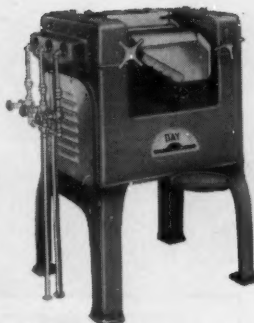
small amount of dehydrating agent, added before slipping on the cap, helps prevent internal corrosion. On threaded pipe, the caps retard drying of thread dope, keep threads free of sand and grit.

Hand Pump: A new hand pump with all-polyethylene working parts has been designed by Bel-Art Products (New York) for standard 13-gal. glass carboys. Called 890 Hand-Pump, it requires no lubrication, delivers 1 gal. of liquid in a few seconds, empties container to 1/8 in. of bottom.

Viscometers: A new series of electric-pneumatic viscometer measuring elements—Models M7, M8, M9 and M10—have been developed by Norcross Corp. (Newton, Mass.). They operate on the falling-piston principle: piston is raised by air-lifting mechanism; sample fills piston tube; then piston is lowered, expelling sample. Time required for piston to fall is a measure of viscosity. The elements will provide viscosity data during process reactions, and in some cases, pipeline data. Viscosity range: 0.1 to 1 million cp.

Safety Alarm: A new remote visual and audible alarm for use with smoke controls, low-water cutouts, flame-failure systems, etc., is available from Way-Wolff Associates (New York). Called Larm-Tector Model 50, it has a red light that flashes on and a buzzer that sounds when an unsafe condition occurs. A time-delay switch for the buzzer is adjustable for no delay to 2-min. maximum delay. Buzzer can be silenced, but light stays on while condition exists. Unit automatically resets itself, cannot be permanently disconnected from circuit by operator.

Bypass Valves: Johnson Service Co. (Milwaukee) offers a new line of 3-way bypass valves for proportional or 2-position control of liquid flow. Flow can be directed to either of two outlets as required; capacity is constant regardless of inner valve's position. Slamming and water-hammer noise is eliminated, it's said, by seating discs against the flow. Maximum pressure is 250 psi. at 406 F, 400 psi. at 70 F. Maximum control air pressure is 25 psi. Valves come in 2 1/2-, 3- and 4-in. sizes, have molded rubber diaphragm operators.



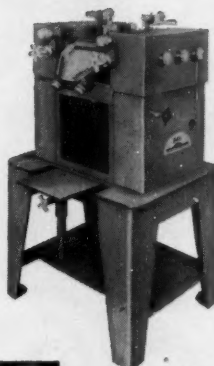
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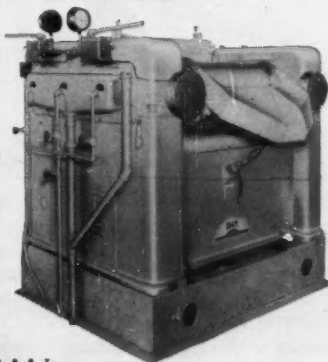
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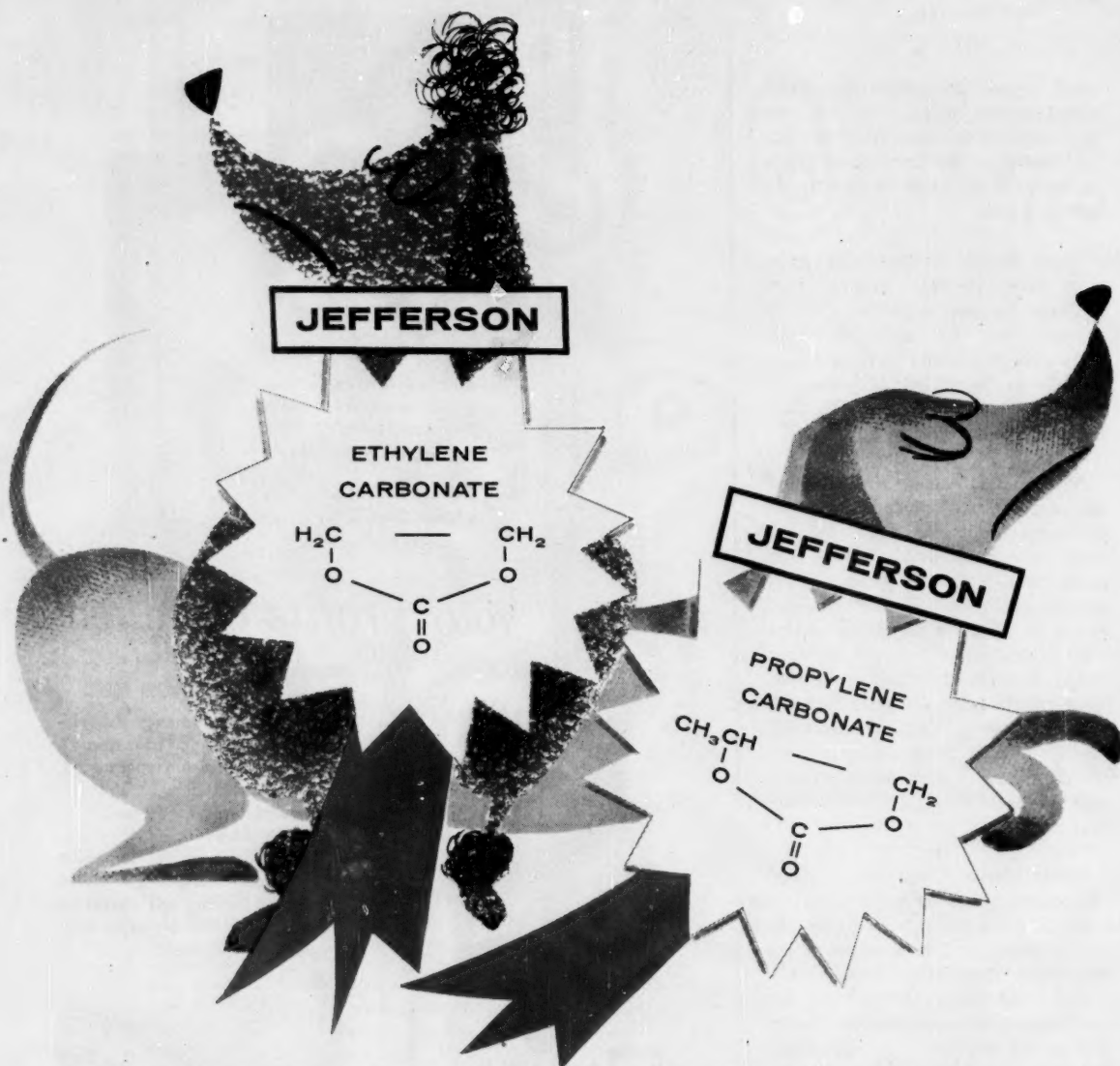
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Technology

Newsletter

CHEMICAL WEEK
September 22, 1956

The big annual I.S.A. show in New York this week is turning the spotlight on instrumentation, its blessings and banes. In the exhibition areas and technical sessions in the Coliseum, in hotel rooms and meeting places throughout the city, in special briefing sessions for the lay and technical press, some 35,000 instrument engineers are spelling out the problems that lie ahead.

Mostly, they're concerned with and stressing the need for planning.

Take the need for a growing number of high-caliber, trained technical help in an era when engineers and scientists are at a premium. The consensus: it's up to industry to take the initiative, to give a real push to training programs, to help key engineers keep up with the field by sending them to universities.

But it's also felt that industry should take special pains to avoid "pirating" educators, thereby depleting the means of assuring a constantly replenishing supply.

Putting a man through college can be tougher than it sounds, of course. The tuition amounts to only half the total cost of a bachelor's degree. Many companies would be willing to ante up the other half. But they just don't have the mechanism for handling it.

What's needed is an industry-sponsored foundation to handle the monies appropriated and to parcel them out.

In their planning, instrument engineers realize that technology is running head-on into the sociological and economic problems of full automation. They feel that, over-all, the transition will be smooth, although there will be many minor upsets in individual industrial segments.

But be that as it may, they know, too, that the movement is going to meet with some resistance from labor. So they're now actively starting to bring labor leaders in on long-range planning and to help lay out training programs for the operators needed in the new plants.

A lot of emphasis is going into control by computers. As of now, just about every conceivable process variable can be measured. The problem is to learn how to tie these variables together, to determine how they're interrelated.

Du Pont has already managed for four days to operate a nylon-intermediate plant in Niagara Falls by a computer in Philadelphia. The object was to find out exactly what's necessary for complete control by computers. Such experiments are expensive, though; it costs about \$2,000/variable for a computer alone.

Technology

Newsletter

(Continued)

Look for word on experiments with fluid mining of trona by Intermountain Chemical. The company tried the idea out about 10 years ago, then abandoned it. But some refinements on the process may now make it feasible.

The firm has applied to the Wyoming land board to utilize nine sections of land in Sweetwater County. (One section is state-owned, the others are federal or deeded land.) In its experiments, Intermountain plans to flood the nine-section area to dissolve the ore. Piping has already been installed to bring the trona brine from the wells to the Westvaco, Wyo., plant.

As Plant Manager C. A. Romano points out, however, underground behavior, chemical impurities and operating difficulties may mean that it will take several years for the method to be fully evaluated.

Two Japanese developments you'll be hearing about, too:

- The Nagoya National Industrial and Technological Research Institute has polished an electrolytic zirconium process employing a chloride electrolyte. The process is said to turn out a metal that's 99.3% pure. Plans for commercializing the process are said to be under consideration.

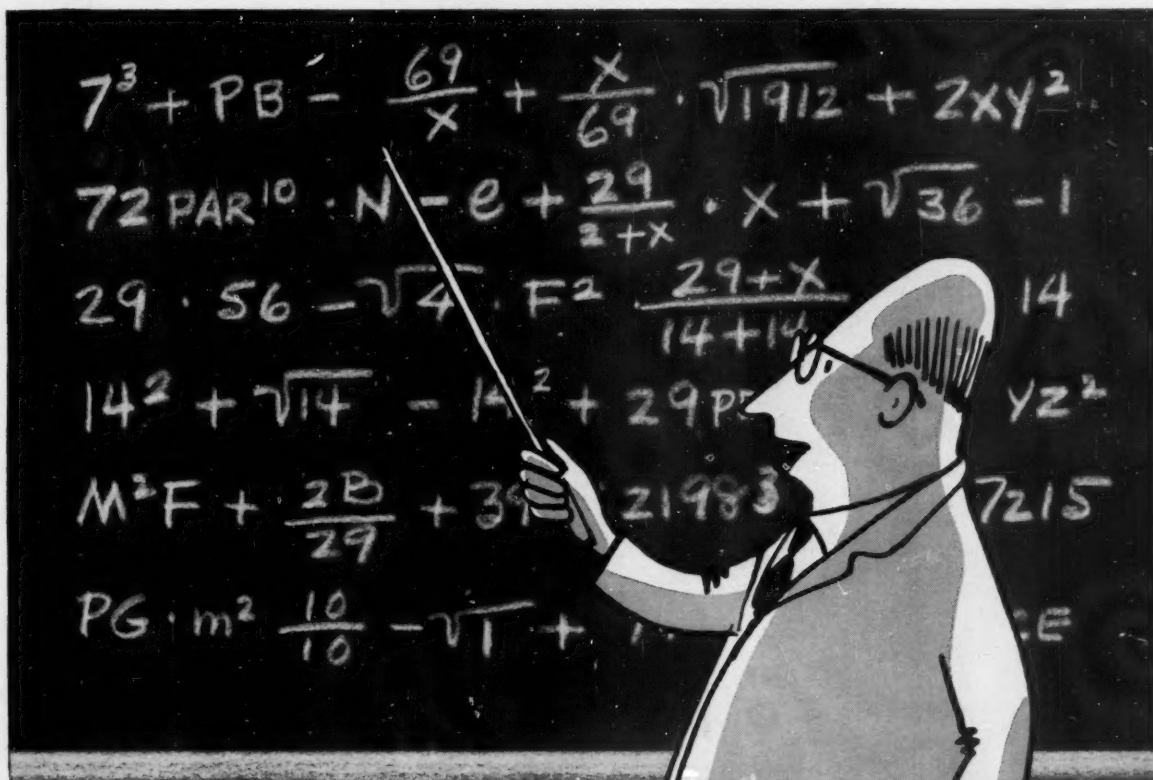
- The Japanese government in conjunction with private industry is weighing the possibilities of producing glucose, molasses, acetic acid and other chemicals from wood. Under study is an experimental plant to handle 10 tons of wood daily. If that should prove out, the next step would be a 40-tons/day plant.

Atomics International (Canoga Park, Calif.) is now bringing out what it describes as a "vestpocket" nuclear reactor. Priced at \$55,000, the reactor fits in a tank 8 ft. high and 8 ft. in diameter, can be placed in an existing lab without the addition of extra facilities, installed and made ready for operation in six months.

Core of the reactor is a 1-ft. stainless steel sphere shielded with 6 in. of lead. It's housed in the 8-ft. tank filled with water. Fuel is an enriched uranyl sulfate in a water solution.

The small reactor, which runs at a power level of 5 watts, is intended for small-scale studies in the engineering, biological and medical fields.

Vitamin B₆ may be an important dietary weapon against tooth decay. That's the conclusion of Merck scientists after observing hamsters, monkeys and dogs. Their work is being published in the current *New York State Dental Journal*.



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Outlook: Imports Now—Exports Tomorrow

Argentine petroleum experts and government officials are being urged to develop—with government sponsorship—a broad petrochemical industry for the nation. Argentina, it's claimed, is ready for an ambitious expansion program*; it has ample supplies of domestic hydrocarbons for use as raw materials, and the national

demand for petrochemicals is adequate to support the undertaking.

Success of the proposed venture is keyed to (1) use of ethylene as the basic raw material (because it's cheaper to use than acetylene derived from imported coke or domestic asphaltite), and (2) sponsorship of ethylene production by state-owned refineries.

Pint-Size Industry: The country already has an embryonic petrochemical industry. Manufacture of toluene from oil refinery liquid and vapor fractions

began in 1943; then, spurred by World War II needs, the vital aromatic was made from crude oil by the Army Ordnance Works (Fabricaciones Militares) until, in '51, the operation was supplanted by a hydroforming and aromatic extraction plant designed and built by M. W. Kellogg.

Also in '43, manufacture of isopropyl alcohol from propane-propylene fractions of vapor-phase-cracking residual gases was begun by Yacimientos Petroliferos Fiscales (YPF);

*Bright prospects for the Argentine petrochemical industry were detailed recently at Buenos Aires by Bernardo Rikles, director of the Buenos Aires branch of the South American Petroleum Institute (ISAP) and technical consultant to Petroquímica E.N.



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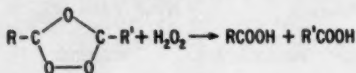
As a result, "Elvanol" is filling an increasing number of jobs in many different industries, including adhesives, textiles, paper, molded products, film, emulsions, and photosensitive coatings. A rundown of some of its more important properties may suggest applications in other areas for which it has not yet been investigated.

One of the most outstanding features of this unique water soluble resin is the high tensile strength



Production of Carboxylic Acids Aided by Hydrogen Peroxide

A number of useful carboxylic acids can be produced through the reaction of unsaturated materials with ozone. Hydrolysis of the intermediate ozonides, however, often results in high yields of undesired aldehydes. This difficulty can be overcome quite simply: The intermediate ozonide is allowed to drip into a solution of either formic or acetic acid and hydrogen peroxide, upon which it is hydrolyzed completely to carboxylic acids.



Some of the practical applications

and tear-resistance of its films. These characteristics have been put to work in the application of unusually tough coatings to a variety of materials without the added cost of organic solvents.

Another property of importance is oil and solvent resistance. All grades of "Elvanol" are unaffected



by animal and vegetable oils, greases, and petroleum hydrocarbons. Resistance to organic solvents increases in the various grades with the degree of hydrolysis of the parent polyvinyl acetate.

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of ozonization and ozonolysis suggested by the literature include the preparation of adipic acid from cyclohexene and hexanoic acid derivatives from substituted heptene. The former is an intermediate for nylon.

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Sodium Reduction of Fatty Acid Esters

For the production of an almost countless number of useful alcohols from plentiful fats and oils, an improved general method has been developed for reducing esters by means of metallic sodium. Practically quantitative yields of alcohols, based on both sodium and ester, are obtained, especially from fatty acid esters of higher molecular weight. The improved method uses theoretical amounts of both sodium and reducing alcohol and the reaction is carried out in an inert solvent, such as xylene or toluene. The method is especially applicable to the preparation of unsaturated alcohols not easily made by catalytic hydrogenation. It compares favorably with catalytic hydrogenation of saturated, higher fatty acid esters because of the simplicity of operation and equipment, and it can be carried out at ordinary pressure.

For more details of this sodium reducing process, check the handy coupon to the left.

MARKETS

output was maintained at 660,000 lbs./year until 1948 when capacity was boosted to 2.64 million lbs./year.

Other petrochemicals produced in Argentina on a small scale include tetraethyl lead fluid for aviation gas, carbon black, insecticides and herbicides (active ingredients for the two pesticides are either imported or made from nonpetroleum hydrocarbons).

Phenol-formaldehyde plastics, urea-formaldehyde plastics, and detergents are produced from imported chemicals. Polyvinyl chloride is being piloted by one firm, using alcohol as raw material, while two companies plan to make it from acetylene.

Acetone, formaldehyde, and butyl alcohol are produced by several firms whose combined capacities for the chemicals are 2.2 million, 5.3 million and 4.4 million lbs./year, respectively. A number of companies also make ethyl alcohol and benzene hexachloride.

More Coming: New domestic petrochemical ventures are definitely in the cards.

Licenses have been granted to Monsanto for the erection of a 6.6-million-lbs./year polystyrene plant that will use imported monomer. In addition, two firms plan production of phenol by benzene sulfonation or chlorination, and one will make acetone and phenol from propylene (cumene process).

Less definite, but still considered likely, is dodecene production; reportedly, Petroquímica E.N. could accomplish this with its present polymerization unit, by investing \$200,000.

Clamor for Chemicals: One big influence in these expansion plans has been demands by the Argentine Chamber of Plasticizers and Moulders for plants to supply plastics, elastomers and phenol. The group forecasts the following 1957 consumption pattern:

	(thousand pounds)
Phenol	6,600
Acrylic compounds	4,730
Polystyrene	5,500
Polyvinyl chloride	6,600
Polyethylene	3,300

Other sources estimate that the '57 polyvinyl chloride demand will almost double by 1960, and that synthetic rubber, carbon black, and tetraethyl lead fluid annual requirements will be about 15,000, 10,000 and 2,000 tons, respectively.

Ethylene's Edge: Although acetylene now appears to be the more economical route to polyvinyl chloride, ethylene is in the spotlight as top raw material for most anticipated petrochemical manufacture.

Two YPF refineries—one at San Lorenzo, the other at La Plata—offer interesting possibilities in ethylene production. When the San Lorenzo cracking unit is operated for maximum gasoline yield, about 2,800 million cu. ft./day of residual gas is produced. (It was 1,700 mcf/day in '53 because of curtailed gasoline production.)

Ethylene content of the gas averages 15% by volume, but increases to 17% with intensive vapor-phase cracking of light gas oil. It's estimated that a 99.5% ethane-ethylene fraction can be obtained by fractionation with a recovery of better than 98% of the ethylene present (98% pure). With improved methods, between 17,600 and 33,000 lbs./day of ethylene could be made at this plant; and if an ethane recycle cracking unit is added, output could be raised to between 40,000 and 66,000 lbs./day.

Ethylene production cost for the San Lorenzo plant was figured, in 1953, at 1.36 pesos (9.71¢ at the then-prevailing exchange rate) per pound for 6.6 million lbs., or 1.10 pesos (7.86¢) per pound for 13.2 million lbs.

Potential ethylene output of the new La Plata refinery is estimated at 88,000 lbs./day using cold fractionating extraction, or 198,000 lbs./day with ethane-propane recycle cracking. Manufacturing costs should be lower than for the San Lorenzo plant, Argentine sources believe.

These estimates indicate that Argentina's 1960 styrene needs for polystyrene and synthetic rubber could be satisfied by domestic production; ethylene could be produced at either San Lorenzo or La Plata, and coke ovens under construction at Argentina's San Nicolas steel plant are expected to produce benzene at a rate of 15.4 million lbs./year.

Furthermore, ethylene may also be produced at the Petroquímica refinery—at competitive costs—by vapor-phase cracking of straight-run liquid fractions. Preliminary estimates made a few years ago pegged at \$6 million the required investment for a 22-million-lbs./year ethylene plant there.

Oil Resources: For the time being, Argentina's chemical industry must



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MARKETS

rely on residual gas from thermal and catalytic cracking units for raw materials.

Right now, a withdrawal of 176,500 mcf./day of natural gas from the country's Northern oil fields would deplete proven reserves in less than 30 years. Based on this, Argentine experts reason it would be unwise to build petrochemical plants that would be fed only by these Northern fields; but when a substantial increase in petroleum production is achieved, natural gas may then be channeled to petrochemical manufacture and Argentina can become an exporter of synthetic chemicals.

Other raw materials will be needed, of course, for the production of diverse synthetic chemical products. About 44 million lbs./year of chlorine is being produced near San Lorenzo and Buenos Aires, but only a small part of this would be available for chlorinating hydrocarbons.

However, Petroquimica has completed a 494-acre evaporating pond near its refinery at Comodoro Rivadavia, can recover 88 million lbs./year of sodium chloride from sea water. Brine will be electrolyzed in a 50-ton/day caustic soda plant scheduled for construction. Consequently, chlorine can be made at a lower cost here than in Eastern plants—particularly because of savings on fuel costs.

Vinyl chloride, ethyl chloride and ethylene bromide could be manufactured conveniently in this area because (1) by-product hydrogen chloride from dehydrohalogenation of dichloroethane (in the production of vinyl chloride) could be used to make ethyl chloride, (2) the new sea water evaporating pond will lower the cost of salt, and (3) bromine can be produced from sea water.

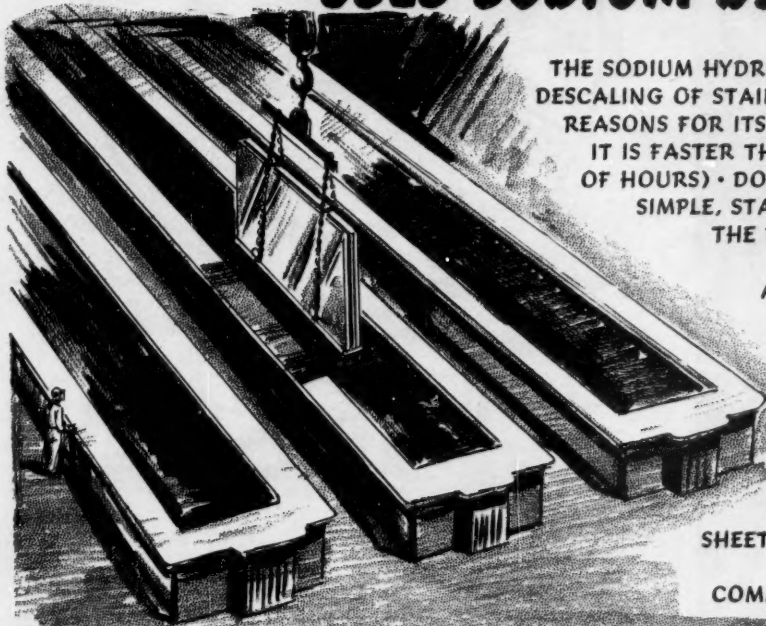
How much and how soon the Argentine petrochemical industry will expand depends largely on the ability of chemical experts to stir government officials into action—state sponsorship of the ambitious project is considered essential because of the Argentine government's key position in the potential production of ethylene.

Chances are, however, that exporters of petrochemicals to Argentina will do well to watch developments closely—the plans call not only for national self-sufficiency in petrochemicals, but also for development of world markets for the Argentine products.

keeping up with

SODIUM

METAL DESCALING USES SODIUM BY THE TON



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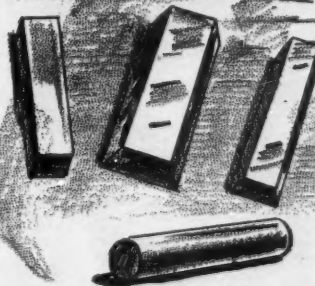
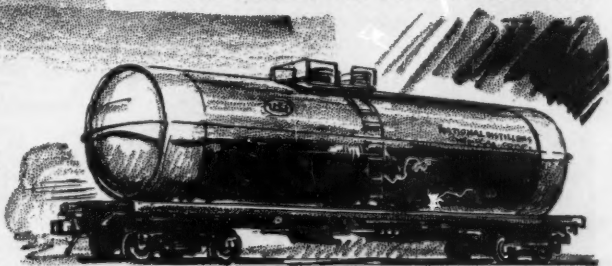
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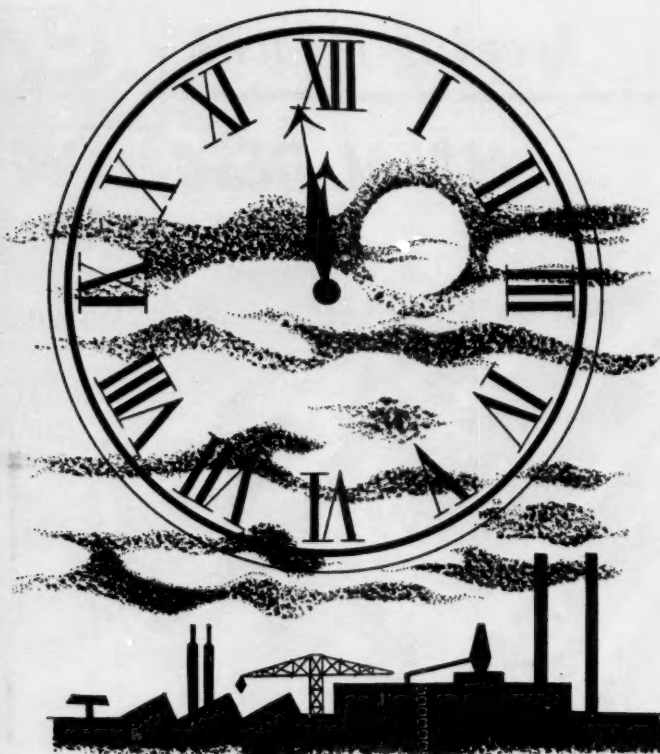
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Market Newsletter

CHEMICAL WEEK
September 22, 1956

The parade of pressured-up prices continues unabated. Along with the bundle of chemical items previously slated for Oct. 1 increases are new ones including sodium silicates, gray sal ammoniac, some fine chemicals, several lacquer solvents, and a few important plasticizers.

Advances on the latter, amounting to $\frac{1}{2}$ ¢/lb. on diethyl and dimethyl phthalate, go into effect immediately on spot, Oct. 1 for contract customers. All makers haven't made the announcement yet, but it's a good bet that last week's 1¢/lb. jump in phthalic anhydride will make these prices industry-wide: 28¢/lb. for tank car lots of the dimethyl; $27\frac{1}{2}$ ¢/lb. on the diethyl.

On the other hand—and despite the phthalic increase—dioctyl and di-iso-octyl phthalate schedules are being reduced by 2¢/lb., as was indicated earlier this month. (*CW Market Newsletter*, Sept. 1). The new quotations ($28\frac{1}{2}$ ¢/lb. tanks on both), though ostensibly a drop, simply bring official lists in line with prices that were already prevalent.

Plasticizer business in general, especially for the octyl types, has been buffeted by rough competition from the increasing number of suppliers coming into the field. The elbowing for markets, of course, was behind the widespread price-shading. Sales at the moment, though, are being described as "lively," the result of fall pickup in buying by the automobile industry and other coating outlets.

The ethyl alcohol hike earlier this year (*CW Market Newsletter*, June 16) is being cited as the reason for upcoming fourth-quarter increases on a raft of solvents, including ethyl acetate, isopropyl acetate, normal butyl acetate, isobutyl acetate, normal butyl and isobutyl alcohol. First to make the move: Eastman Chemicals. The increase, $\frac{1}{2}$ ¢/lb.

Incidentally, ethyl alcohol circles are buzzing with speculation that the solvent is headed for a split-price situation—one tag on synthetic ethanol, a higher one on fermentation material. Here's a squelcher: the one company in the country that should know tells *CW* that such an eventuality is completely unlikely—there'll be no price altering on fermentation alcohol through the fourth quarter.

Reason advanced for the statement: there is—and will be in the foreseeable future—enough nonsynthetic alcohol to preclude any price-jolting shortages,

In Canada, though, alcohol prices are moving in both directions—up and down. Commercial Alcohol Ltd., which is said to furnish about 60% of the total Canadian industrial alcohol consumed, is knocking 10¢/gal. (imperial) off 15 grades of pure and denatured material used for industrial purposes. Prices on five other grades, however, are being upped by 4¢/gal.

Market Newsletter

(Continued)

The company, a subsidiary of Canadian International Paper, processes some 1 million gal./day of waste sulfite liquor to recover cellulose sugars that eventually produce more than 4 million proof gal./year of pure ethyl alcohol.

That prices on tartrates are moving higher comes as no surprise to market followers. The supply situation on the basic material, argols, has been worrisome since the Suez crisis developed, and has placed in jeopardy needed replacements of the crude raw material.

The advance in domestic makers' prices of tartaric acid, potassium bitartrate (cream of tartar), and Rochelle salt will amount to 2¢/lb.

In line with earlier posted advances on c.l. quantities of soda ash, caustic soda, bicarbonate of soda and modified sodas, Diamond Alkali (and probably most other sellers) will also up l.c.l. prices on these commodities from 10¢ to as much as 40¢/cwt. Same effective date—Oct. 1.

Add, too, some soon-due increases on a number of sodium compounds. Monsanto, for example, has already told customers its anhydrous sodium bisulfite will go to \$5/cwt. (c.l., in bags), while Cowles Chemicals will raise its sodium silicates for industrial cleaning up to 40¢/cwt.

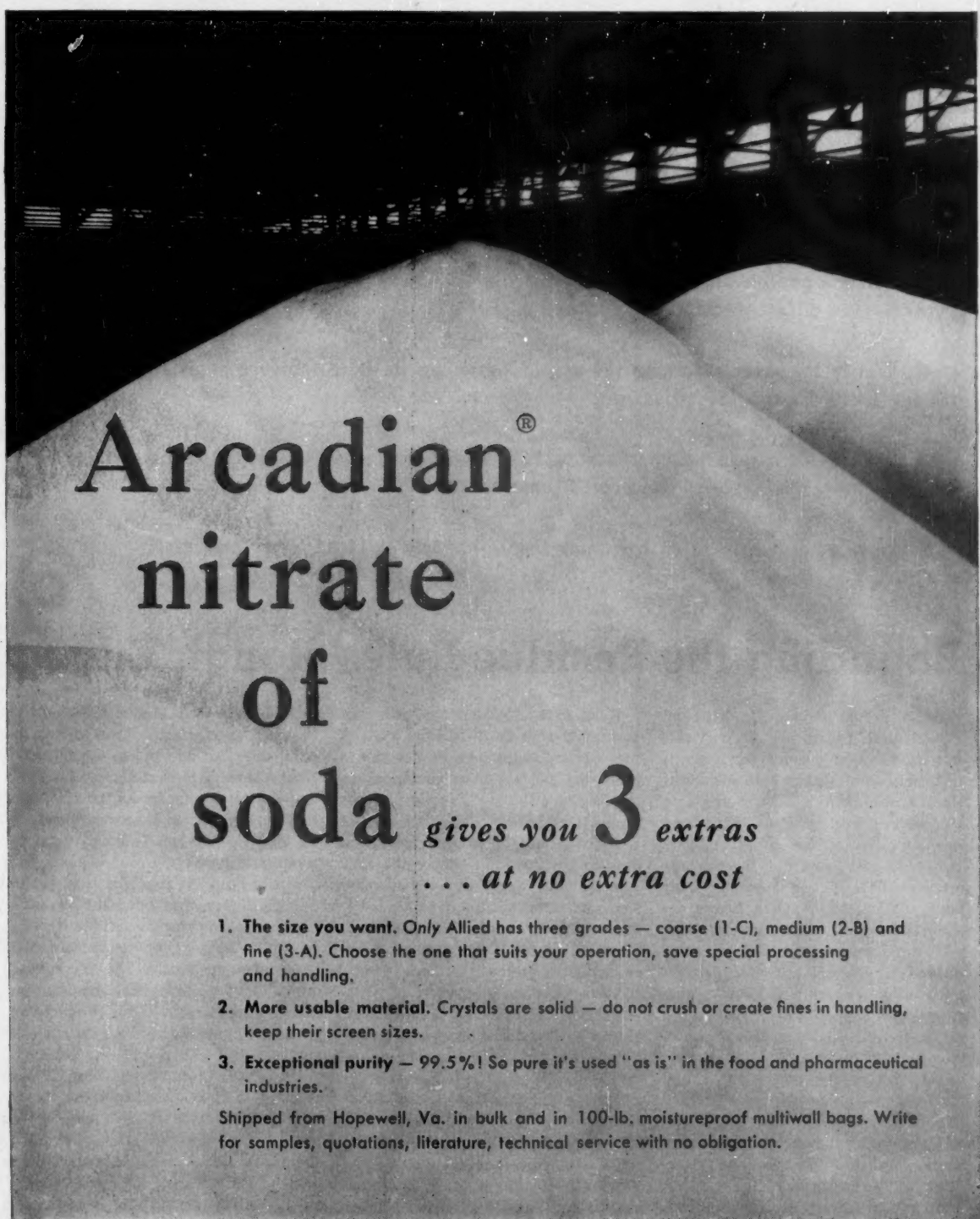
There's a higher price in sight for gray sal ammoniac, too. Out of Philadelphia comes Pennsylvania Salt's new schedules: in 100-lb. paper bags (c.l. or t.l.) cost will be \$8.25/cwt; in l.c.l. lots, \$9.25. Prices are f.o.b. Wyandotte, Mich., freight equalized with East Chicago, Ind., and Cleveland.

It's the first increase in more than three years, says the company, and the reason: the repetitive refrain—"increased labor and raw material costs."

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending September 17, 1956

	Change	New Price
UP		
Diethyl phthalate, dms., c.l., dlvd.	\$ 0.005	\$ 0.30
Dimethyl phthalate, dms., c.l., work	0.005	0.305
Tankage, N.Y., per unit ton	0.25	5.25
DOWN		
Diethyl phthalate, dms., c.l., frt., alld.	\$ 0.02	\$ 0.31
Di-iso-octyl phthalate, dms., c.l.	0.02	0.31
Octyl-decyl phthalate, dlvd., dms., c.l.	0.015	0.29
Crude candelilla wax, bgs.	0.02	0.68

All prices per pound unless quantity is stated.

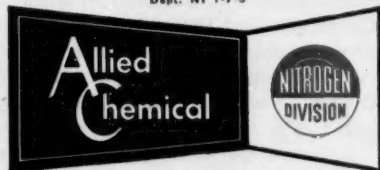


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SPECIALTIES

The National Agricultural Chemicals Assn. meeting last week brought out these suggestions for improving the two-year-old Miller Pesticide Amendment:

- Settle one tolerance level per pesticide—do away with different levels of the same pesticide for different crops.
- Clarify the rules governing the use of pesticides in those approved applications for which residue limits have not been set.
- Take a more realistic approach to the use of pesticides on forage crops—virtual prohibition—now the case—is considered unsatisfactory.
- Provide residue research for crops that offer only small pesticide markets.

Rounding the Residue Rules' Rough Edges

As a proud parent, the National Agricultural Chemicals Assn. never lets its attention wander far from its offspring—the Miller Pesticide Residues Amendment. This was strikingly evident last week at the 23rd annual meeting of the NACA in Spring Lake, N.J. Now two years old, the amendment has been functioning fairly well; but it still squeaks in a few places.

On the whole, industry strongly supports the legislation, an NACA survey showed. But there are (*see above*) a few areas in which both industry and government representatives have indicated that they would like to have things settled, clarified or modified. Because most of the suggestions about the act show the need for clarification or interpretation, NACA hopes to set up conferences among industry, the Food & Drug Administration and U.S. Dept. of Agriculture.

As part of its program for improvements, NACA would like to deal with industry criticisms concerning analytical methods, amount of data required, temporary tolerances, time involved to get petitions acted upon. Entomological researchers would like to get most of the residue questions settled so that they can spend more time on more basic studies.

Road to Riches: Though primarily concerned with the Miller act, NACA took the opportunity this year to explore the potential for pesticides in the nation's highway building program.

Among the points brought out in the panel discussion of the subject:

- By and large, highway departments have the greatest need for selective weed killers and growth inhibitors. There is, so far, a lesser demand for pesticides to protect the trees, shrubs and grasses along parkways.

- New highways are just one part of the market for agricultural chemicals—their use on established roads can be of profit to both highway departments and chemical makers. Cited as a conservative example was the case where one county found that \$20,000 worth of chemicals did the job of \$65,000 worth of other vegetation control methods.

- Plainly, too few highway departments are fully aware of how much time, trouble and money chemicals can save them. Only about 10% of the departments utilize chemical methods, one estimate indicated.

Introductions, Please: Just as much a part of the job of developing new chemicals is that of getting the farmer

to buy them. NACA devoted part of its meeting to studying how chemical companies can best utilize the agricultural scientists, publications, radio-TV, and dealers to put across the story of their new materials. It seems clear that all play a part in "selling" a new product to growers.

It has been the experience of most manufacturers that once the farmer has used a new pesticide with successful results, he's likely to become a fairly regular customer. The increased crop output made possible by chemicals commits him to highly productive growing techniques, so there's no turning back.

Change in Command: This 23rd meeting brought to a close the two-term presidency of W. W. (Bill) Allen, Dow Chemical's agricultural chemicals sales manager, who has guided NACA during the introduction of the Miller amendment, and who has helped place NACA emphasis on safety. Allen was succeeded by Shell Chemical's Fred Hatch. Hatch's vice-president chair was in turn taken over by Jack Vernon, of Niagara Chemical Division, Food Machinery & Chemicals Co.

New on the NACA board of directors are Art Mohr, of California Spray

Chemicals Co.; George Vila, Naugatuck Chemicals Division, U.S. Rubber Co. Tom Wilkerson, American Cyanamid, was re-elected to the board.

Next meeting of NACA is scheduled for March, in San Francisco.

The Hotter, the Better

A new polyester-base insulating varnish for electric motors, introduced last week by Schenectady Varnish Co. (Schenectady, N.Y.), is claimed to permit the manufacture of Class B electric motors without the use of expensive silicone varnishes and enamels. That's a "first" in motor-making, says the firm.

The new varnish alone isn't the secret of these new motors. Previously developed polyester magnet-wire enamels (such as GE's Alkanex; Schenectady's Isonel) and polyester insulating sheets (e.g., Du Pont's Mylar), used in the motors, share credit for making possible the achievement. But varnish for impregnating coils has been the missing product, and its introduction now should give motor makers plenty to experiment with.

Class B equipment can stand up under "hot spot," or short-term operation, at temperatures around 135-140 C. Most conventional motors must work under the Class A limit of 105 C hot-spot temperatures. Big advantage of the higher temperatures is greater motor efficiency: they produce 25-30% more power per pound; a Class B motor 25-30% smaller can handle jobs of equal-power Class A motor.

The new motors, because of re-engineering and use of more-expensive materials, will likely cost somewhat more than Class A models. Isonel, which is what the new varnish is called, costs about \$3.50/gal.; a top-quality material for Class A work sells for about \$2/gal.

Isonel's price, however, is well under the \$15/gal. tag on silicone motor varnishes. But the special silicones permit construction of motors that can withstand 180 C temperatures.

The new varnish resembles conventional varnishes. It thins readily with mineral spirits, may be used on conventional equipment. It cures at readily obtainable baking temperatures.

Hum in the Running

That Lever Brothers is staunchly backing liquid synthetic detergents was emphasized again last week by the introduction of a second heavy-duty compound, Hum.

The new product, now being test-marketed only in Columbus, O., bears some resemblance to the firm's previously introduced Wisk (*CW Business Newsletter*, Feb. 4)—it's blue in color, packed in metal cans (pint and quarts), is quick-dissolving, and features heavy use of optical whiteners.

But there are some major differences: Hum is a regulated suds detergent—a low-foamer designed especially for automatic washers.

Somewhat stung by some trade talk that the liquids don't get clothes as clean as powder syndets, Lever is now claiming that its liquids clean faster and better than any powder products. It has assembled plenty of data to show that the faster-dissolving liquids are fully available for doing actual washing for five minutes longer than are most powders.

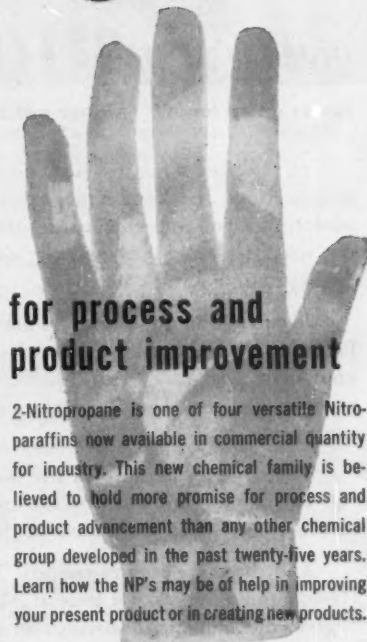
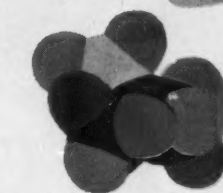
Hum is now available in only one city, and that's a city where its cousin Wisk is not yet sold. Just when—or even if—Hum will go into wider distribution, Lever won't say. But Hum has a *Good Housekeeping* seal, which indicates that it will eventually be nationally advertised. The extent of the national advertising no doubt depends on results in Columbus.

Quick Change

Auto owners interested in speedily changing the color of their cars will take special interest in a new paint being launched this week by Martin-Senour Paint Co. (Chicago, an affiliate of Sherwin-Williams). Designed particularly for the automotive refinishing shop, the new coating dries in about 30 minutes—two coats can be applied in quick succession.

The new paint, called Dythol, is based on a newly developed copolymer. Martin-Senour says it matches all types of previously available re-coating materials in appearance and durability. It costs about 15-20% more than conventional paints, but, M-S says, labor savings should permit re-paint jobs for under \$30/car.

MEET 2-Nitropropane



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2-Nitropropane is one of four versatile Nitro-paraffins now available in commercial quantity for industry. This new chemical family is believed to hold more promise for process and product advancement than any other chemical group developed in the past twenty-five years. Learn how the NP's may be of help in improving your present product or in creating new products.

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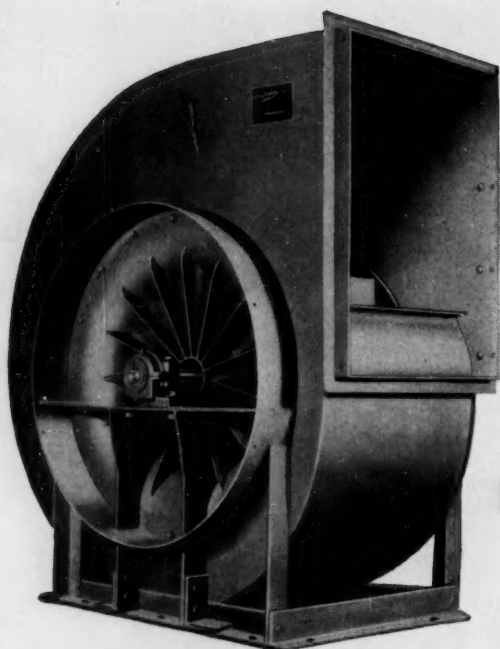
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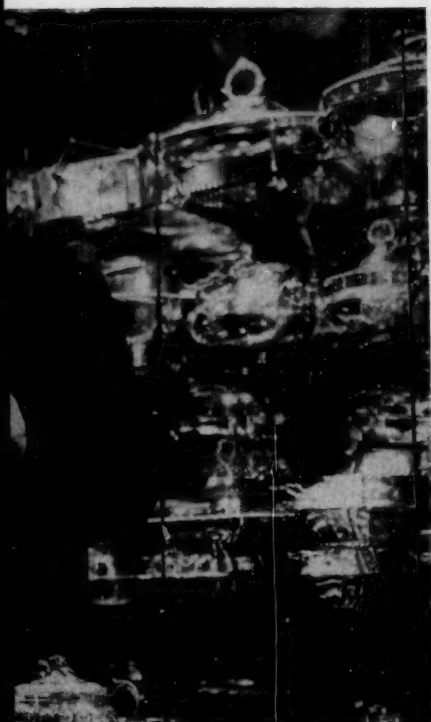
After only six months of national distribution, Glenwood Products Corp.'s (New York) Silver Sheeld is nearing the \$0.5-million sales mark. It means that aerosol-packaged, vinyl-base protectives* (CW, May 12, p. 52) are coming into their own.

The new product, a 12-oz. spray container that retails for about \$2, was trial-marketed briefly in Washington and Baltimore before national distribution was started. Silver Sheeld's ad campaign stresses easy application and removal of the thin plastic film. Soap and water alone will remove the coating, although a little household ammonia speeds the job. Glenwood further courts consumer favor by guaranteeing that Silver Sheeld contains no abrasives.

Some consumers have reported occasional clogging of the valve. And

†Woodruffs (New York).

*Unofficial endorsement of the effectiveness of this type of product—in which the balance of solvent to resin is critical—comes from several noted museum curators. Museum spraying equipment, however, does a more economical job than consumer-size aerosols.



LIONEL CRAWFORD

aerosol lacquer for silver.

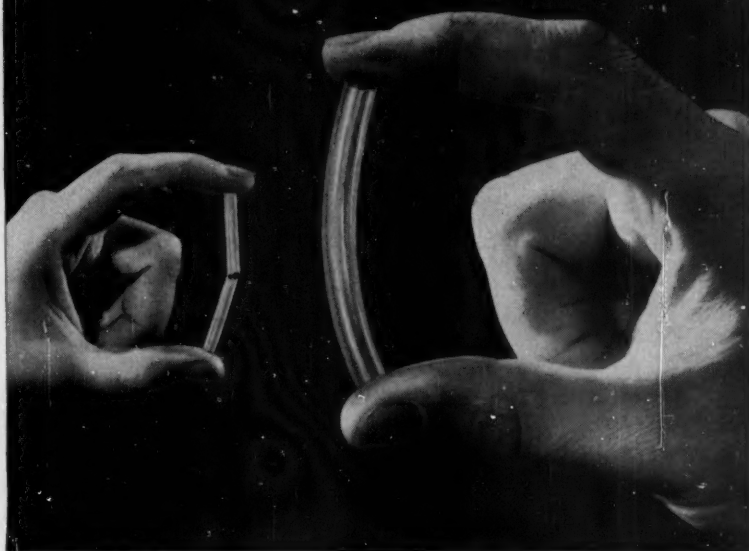
g he Shine

dealers wonder why the can doesn't have a top that will permit stacking; (the can's base appears to be designed for stacking). There's also some feeling that the retail price of \$2 is too high.

Silver Sheeld is not a polish, but its maker claims that it eliminates the need for frequent polishing, and this could conceivably cut into sales of silver polish. It's also claimed that silver requires only dusting—not polishing—after application of the spray, a feature that could help reverse a long-standing household trend away from the display of silver serving pieces and similar objects.

Specialty makers have long been convinced that the best way to prevent tarnishing of silver is to seal its surface. The big difficulty: to find a non-toxic coating thin enough not to dull silver, and at the same time not give a "curtaining" effect when applied. Most older, nonaerosol lacquers were difficult to apply and formed a film almost impossible to remove. Silver

Odd-Carbon Azelaic Acid makes polyesters different!



The odd number of carbons in C_9 azelaic acid results many times in unusual properties in end products. For example, in unsaturated laminating polyesters, Emerox® Azelaic Acid results in increased flexibility and low-temperature impact resistance, both of which broaden their utility.

For all polyesters, whether they be unsaturated laminating, casting or potting types, or polyesters for urethane foams, plasticizers, or surface coatings (alkyds), Emerox Azelaic Acid offers an opportunity for unusual properties.

Likewise, in any field where dibasic acids are of interest, azelaic acid may create important differences that could lead to the development of new products or to improvements in present products.

Mail coupon below for technical bulletin describing Emerox Azelaic Acid.



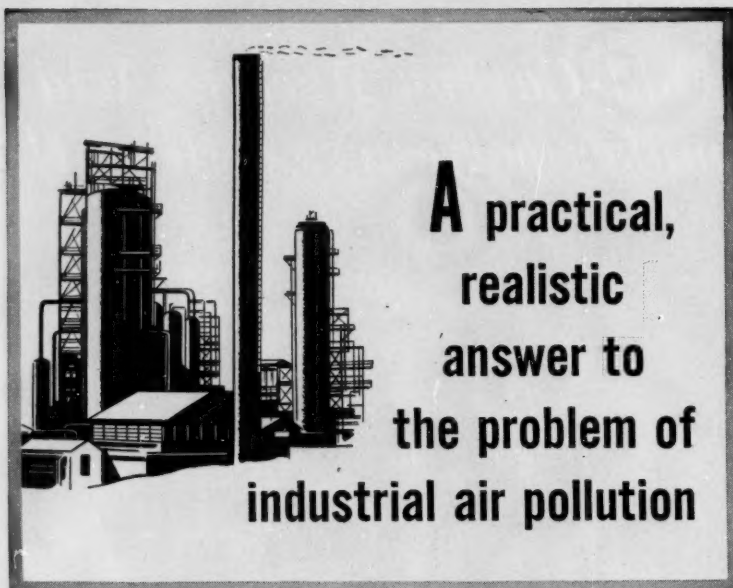
Organic Chemical
Sales Department

Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio

Emery Industries, Inc. • Dept. 19-A, Carew Tower • Cincinnati 2, Ohio

Please send Technical Bulletin titled "Emerox Azelaic Acid."

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Company _____
Address _____
City _____ State _____



A practical, realistic answer to the problem of industrial air pollution

**Catalytic oxidation can now eliminate
objectionable fumes and odors from your stack exhausts
effectively, efficiently — and often at an actual saving
— with the use of Houdry Oxycats [®]**

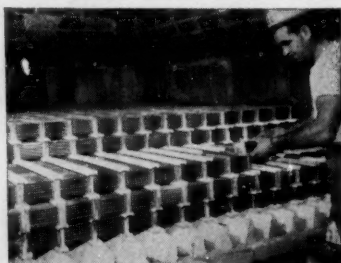
Properly engineered to your individual requirements, Houdry catalytic installations can eliminate, or reduce below objectionable levels, harmful and irritating fumes and odors in an exhaust stream.

These Oxycat installations are working effectively for a wide range of industries where combustible and organic pollutants are present, including solvents, phenols, formaldehyde, phthalic anhydride, polyethylene and carbon monoxide. Oxycats can also be used to oxidize H_2S and organic sulfides and to reduce oxides of nitrogen. And in many cases the heat released by the oxidation process will result in important fuel savings.

The key to any successful catalytic installation, of course, is the catalyst itself. Oxycats have an outstanding advantage in their exceptionally long life at high efficiency. There's no problem of frequent cleaning or reprocessing because of the Oxycat's remarkable ability to withstand contaminating agents and clogging.

It's best to design Houdry Oxidation Catalyst installations into your plant

when it is in the blueprint stage. But your engineers, working with ours, can effectively install Oxycats in any existing plant. If air pollution is a problem in your operation—if foul-smelling, irritating fumes and odors are costing you neighborhood good will—Houdry Oxidation Catalysts present a solution you cannot afford to overlook. Write on your business letterhead for complete information now.



Houdry Oxycats being installed in a waste heat boiler at a Sun Oil Co. catalytic cracking unit at Marcus Hook, Pa. This Oxycat installation and a similar one at Toledo save Sun Oil \$400,000 a year by oxidizing waste gases to generate 100,000 lb. of process steam an hour.



A Houdry Catalyst

OXY-CATALYST, INC. INDUSTRIAL DIVISION

Wayne 6, Pa., U.S.A.

**Fume Elimination Processes and Equipment
Industrial • Automotive • Consumer Products**

Representatives in major industrial areas

SPECIALTIES

Sheeld, by overcoming these difficulties, is opening up a new specialties field with a multimillion-dollar potential.

PATENTS

Complexed Iodine: West Laboratories, Inc. (Long Island City, N.Y.) has been granted a patent (U.S. 2,759,869) on its complexed iodine germicides. The new compounds, made by treating nonionic carriers with iodine, contain the element both in tightly held, nontitratable form, and also as a free, readily titratable material.

• **Rohm & Haas** is also showing interest in the iodine-surface-active agent combinations. According to British patent 750,747, R&H can make iodine germicidal compositions by dissolving iodine in aqueous solutions of the salts of sulfonated naphthalene and formaldehyde.

• **Masonry Raincoat:** In a recently issued patent (U.S. 2,757,159), Sta-Dri Inc. (Odenton, Md.) combines silicone with an "inorganic settable material" to provide a moisture-proofing compound for masonry. The compound, designed for porous walls, has about 50% solids, about 1% (or less) silicone resin—the solid particles are coated with resin. Water can be added to the mixture at the time the masonry is to be coated.

• **Gleam Builder:** A new polish and cleaning combination has been devised by Charles Guss (Omaha). Guss puts a little dimethylpolysiloxane (0.61% by weight), glycerol stearate (0.035%), polyoxyethylene stearate (0.035%) and polyethylene glycol *tert*-dodecylthioether (0.200%) in water, gets a milky polish-cleaner for all types of nonabsorbent surfaces (U.S. patent 2,757,094).

• **Silicone Chaser:** Detrex Corp. (Detroit, Mich.) has developed a way to remove hardened silicone resin glazes from tin-containing metal surfaces (U.S. Patent 2,755,209). Detrex specifies a chlorinated hydrocarbon (carbon tet, methylene chloride, perchlorethylene) fortified with an alkali metal hydroxide, and an alcohol (or polyol). The alcohol is used to dissolve the 0.02-5% caustic. The complete formulation is used at 55-77 C.

Look to the World's Largest Rubber Producer for All Your Rubber Needs

for Natural

Over 10,500,000 trees under cultivation on Firestone's Liberian plantation—the world's largest single plantation



for Synthetic

Production increased 50% last year in Firestone Synthetic Plants—the world's largest

Firestone has the Rubber for Every Product—for Every Application

Are you planning a new product . . . Are you having trouble obtaining just the right rubber or latex for your present product? If so, why not do as hundreds of manufacturers have done . . . turn to Firestone, the world's largest rubber producer. Our research and development laboratories are at your service. A Firestone Technical Representative is ready to help you with your compounding and processing problems. Call him in today.

Learn how Firestone high quality latex and dry rubber can fit into your operation and improve the quality of your product. Why not write today for your copies of the new, colorful, informative brochures on Firestone's new FRS Latex and Dry Rubber. There's no charge, of course. Just drop a line to Firestone Synthetic Rubber and Latex Division, Akron, Ohio.



Firestone

BEST IN RUBBER



FDA Warns Drugmakers:

- Stop issuing unauthorized new-drug brochures
- Stop pushing experimental drugs commercially

Sales Tactics Under Fire

Rumblings of discontent are currently emanating from Food & Drug Administration over the alleged tendency by a few firms, in the hotly competitive drug industry, to cut corners in meeting the agency's safety rules.

Arousing official ire are these two practices: use of unauthorized (by FDA) brochures and other literature to promote new drug products to the medical profession; "blatant and purposeful abuse" by some firms of the law's exemption from the new-drug clearance procedure of drugs distributed for experimental purposes.

Under the law, manufacturers must obtain FDA approval before marketing a new drug. This extends to the package label and descriptive literature distributed by the manufacturer to physicians. But, according to FDA's medical director, Albert Holland, Jr., there is a growing tendency on the part of some firms to "essentially ignore" the carefully phrased statements of their new-product brochures after they get FDA approval.

In some cases, the brochures okayed by FDA never get printed, or are soon replaced by others not cleared with the agency. Companies, says FDA, substitute other literature "bearing little resemblance, if any," to the original. In at least one case, the substituted version claimed for the new drug some healing powers for diseases never mentioned when the manufacturer talked with FDA. In several other cases, the approved brochure specified much lower dosage levels than those recommended in a booklet subsequently sent to doctors. Occasionally, such mailing pieces omit mention of contraindications that FDA and the manufacturer had agreed should be in the brochure.

Sales Pitch Off Key: FDA has several explanations of the increase in this practice. It feels that manufacturers often are too easily swayed by

their salesmen. "They don't know what claims they want to make for the new product until the sales department tells them," commented one FDA official. Too, once the medical brochure is out of the hands of the company's medical department, promotion-minded officials take over, dress up the brochure into more eye-appealing form, sometimes omitting necessary cautionary notes that might depress sales. All this, in FDA's view, adds up to a "lack of appreciation of the solemn enforceable agreement" the manufacturer has entered into with FDA. "An [approved] new-drug application is beyond doubt an official legal document," says Holland. "It defines in no uncertain terms the indications, contraindications, cautions, dosage and basic professional literature. To break the terms of the [approved] application is to court trouble."

What Sort of Trouble? If flagrant

violations persist, warns Holland, FDA will suspend the violator's new-drug application—forcing him to withdraw the product from the market. "We intend to preserve the integrity of the new-drug procedure, and these practices go to the very heart of that procedure and its basic philosophy."

FDA is undertaking a complete revision of the rules governing distribution of new drugs for investigational use to "limit, if not obviate, the blatant and purposeful abuse of this section of the law." Under the law, a manufacturer is permitted to distribute a new drug to hospitals and physicians prior to FDA approval of the drug for general sale. But use of such drugs must be clearly limited to investigational purposes. There's scarcely any procedural red tape involved—and almost no safeguards against abuse. The idea is to avoid obstructing or delaying progress in medical treatment between the time a new-drug application is filed and its final approval, usually several months later. "As it now stands," says Holland, "some manufacturers are engaging in the active sale of competitive new drug products on a bid basis for institutional and other purposes without the slightest intention of obtaining an effective new-drug application." Other abuses, he says, exist where thousands of doctors have been sold drugs labeled solely for investigative purposes.

Citing specific cases, FDA tells of a firm that sponsored hospital research on a promising new arthritis drug. Word of the tests spread, and the publicity resulted in a number of requests for the product from physicians. The company distributed the drug "very freely" to these physicians and charged them for it. After looking into the matter, FDA concluded that aside from the hospital investigation the drug was being marketed for therapeutic use before FDA could examine the firm's evidence of the drug's efficacy for its intended use.

In other cases, manufacturers have sent out droves of "detail men" to stimulate "requests" from physicians for a new, but uncleared, drug. As expected, sales to the doctors soared, although each package or bottle contained the label limiting sale to investigative use.

FDA has no doubt that the law is



FDA'S HOLLAND: Aims to preserve integrity of new-drug procedure.

clearly on its side in allowing exemptions only when the quantities distributed are reasonably in line with needs for investigational purposes. But it concedes that its rules for carrying out this part of the law (1.114 of Section 505 (1), Food, Drug and Cosmetic Act) are vague. To clear up the issue, FDA plans a revision of the exemption rule for investigational use distribution, will soon ask for industry comment on the proposed changes.

Holland's strongly worded caution, plus the recently enlarged staff of the new-drug branch of FDA (*CW*, May 5, p. 80), may well result in some hasty reforms among the few offending drugmakers—and soon.

COMPETITION

- Parke, Davis will open a sales promotion office in Singapore to supervise and facilitate medical service coverage in Thailand, Malaya, Vietnam, Cambodia, Laos, Indonesia and Borneo.

- American Aniline Products, Inc. (Koppers Co., Inc. subsidiary), will build a new sales office, laboratory and warehouse at Paterson, N.J.

- Schwartz Chemical Co. has expanded its sales organization by appointing 20 new representatives throughout the world.

- Dow Chemical of Canada, Ltd., has opened a sales office in Calgary.



Course to Commercialization

A GRADUATE-CREDIT evening course in commercial chemical development, believed to be the only one of its type in the country, will get under way at Columbia University on Oct. 1. Instructor: John J. O'Connell, manager of Shell Chemical's Solvents Dept.

Lectures and case studies will cover current industry practice, show approaches to problem solv-

ing. Guest lecturers will discuss specific departmental organization, projects, and functional areas.

The course will be oriented to people with part-time commercial chemical development responsibility, high school and college teachers, firms' junior staff members, recent undergraduates and research, production, promotion and marketing personnel.

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Our 25th Anniversary

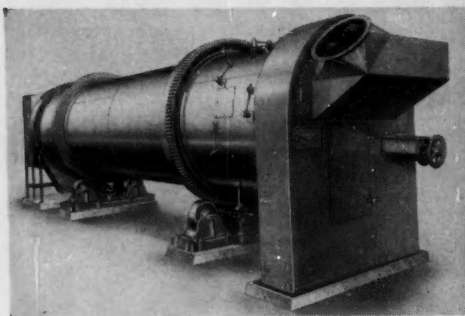
seems an appropriate time to express our appreciation to the Corporations and Investors who have availed themselves of our services and to the Investment Firms and Financial Institutions whose helpful cooperation enabled us to render these services.

F. EBERSTADT & CO.

65 BROADWAY • NEW YORK 6, N. Y.

September 1, 1956

DAVENPORT ROTARY HOT AIR DRYER 6'0" dia. x 25'0" long



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PRESSING — DRYING
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and Direct Fire
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This "Davenport" Rotary Hot Air Dryer is of stainless steel construction. Dryer is installed in one of the large processing plants, drying wheat gluten.

Let our engineers consult with you on your Pressing, Drying, and Cooling problems. Send for complete Catalog B, or for quick reference, consult your *Chemical Engineering Catalog*, 1954 or 1955.

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SALES

Banker Boost

Credit for fertilizer purchases—a bigger-than-ever industry problem this year—is getting a more sympathetic understanding by the banking business. That's what W. Raoul Allstetter, National Plant Food Institute vice-president for promotion and education, told CW last week.

More and more rural banks are including loans for the purchase of fertilizer by farmer customers in their standard budgets. California's Bank of America, with its hundreds of branches, regularly budgets for such loans. And, he adds, many small banks elsewhere have established fertilizer loan programs based on fertilizer use practices recommended by state experiment stations or college agronomy departments. This recent and still-growing development, Allstetter says, comes as a relief to the local fertilizer mixer and dealer, at times hard-pressed to extend credit to farmers. Mixers and dealers hold that fertilizer financing is a function of the local banker. And now, apparently, the local banker is beginning to agree, is taking on that function as a routine operation in financing.

Understandably, the institute is spurring further development of the trend, is continuing and expanding its services to bankers. Since 1953, some 17 state banking associations have published fertilizer promotional literature in cooperation with NPFI and state agronomy sections. Maine and Minnesota banking groups have just swelled the total, and others are expected to follow suit.

Banks and state agencies have gone along with the NPFI program on the grounds that modern fertilization practice benefits industry, farmer and consumer. The institute has been shouldering the leaflet cost and part of advertising mat expense. In Colorado, for example, NPFI spent about \$800 ("out of pocket") in preparing 50,000 leaflets. Members of state banking associations handle leaflet distribution and distribution costs, run the mats as institutional ads in local media. In addition, they contribute the time put in by their salaried staffs on all phases of the program.

Present plans for expansion, Allstetter believes, attest to the results. Banker support is a valuable asset in beefing up fertilizer sales.



Brand the Market

THIS whopping, 32-page ad, the largest ever in the building-materials field, is the answer to a tough sales problem that faced Carbide's Silicones Division.

In the fast-growing masonry water-repellent market, UCC found, it was doing a good job of pushing silicones in general—but builders didn't know which repellent formulators used UCC's products. Solution: a mammoth ad (see cut) tying in Carbide silicones with brandnames.

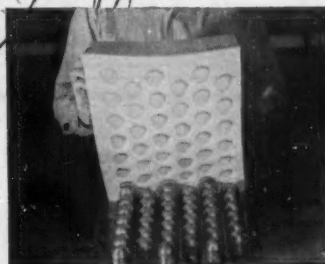
The idea took three months to execute. The Silicones Division loosed its entire field sales staff on the project, supplied small companies with ideas for ads, sold advertising space and paid production costs. Result: UCC (13 pages) shares the ad with 76 formulators in 72,000 September copies of two building-trade magazines.

One problem: some large formulators balked, feared such an ad would "level the field" by making all formulators seem equally important.

But Carbide stipulated that formulators' ads stress the geographical area served, suggested that individual companies could run follow-up promotion. Now, says UCC, formulators are glad they listened.

speaking of **VINYL** foam

How can we get
greater
tensile strength?



Texture and cushioning properties of foam vinyl are predictable and reliable. Photo shows mold and finished cushion. Courtesy Elastomer Chemical Corp.

● More complete expansion and stronger cell structures are being obtained by vinyl foam processors with BENZOFLEX® plasticizers... at all compression-density ratios.

And, lower curing temperatures result in faster fusing cycles.

It will pay you to check into the money-saving advantages of these distinctive TENNESSEE plasticizers for vinyl foam, tile, adhesives, coatings, plastisols and other products. Write...



TENNESSEE
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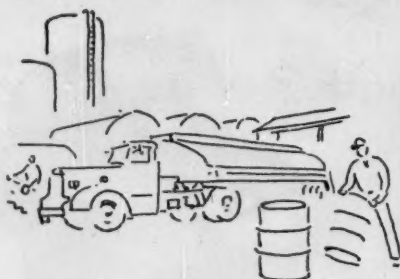
Corporation
NASHVILLE, TENNESSEE.

A DIVISION OF THE CHEMICAL, PAINT AND METALLURGICAL DEPARTMENT OF MERRITT-CHAPMAN & SCOTT CORPORATION

TENNESSEE'S line of top-quality chemicals includes: SODIUM BENZOATE • BENZOIC ACID • BENZYL CHLORIDE • BENZOYL CHLORIDE • BENZOTRICHLORIDE • BENZYL ALCOHOL • BENZYL BENZOATE • TENN-PLAS • BENZALDEHYDE • MURIATIC ACID • ACETIC ACID • METHANOL • BENZONITRILE • BENZOFLEX

WE SUPPLY CHLORINATED SOLVENTS

from our NEWARK warehouse



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Perchloroethylene — "Vythene"*

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ESTERS
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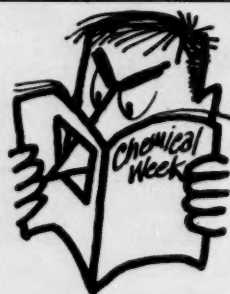
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ANY ODOR PROBLEM
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WE'LL PRESCRIBE!

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SALES

DATA DIGEST

• **Wood preserving:** Fifteen revised and three new standards have been issued by the American Wood-Preservers' Assn. (Washington, D.C.) for its technical Manual of Recommended Practice. The standards cover such topics as pentachlorophenol treatment of pine lumber and pressure processing of railroad car lumber.

• **Irradiated polyethylene:** 12-p. bulletin describes the electrical insulation properties, moisture and chemical resistance, encapsulation ability, thermal stability, and other properties of Irrathene (R). Chemical Development Dept., General Electric Co. (Pittsfield, Mass.).

• **Epoxy resins:** Chart presents physical and electrical data for 27 resin systems. Room-temperature-set, heat-cured, filled, unfilled, resilient and rigid resin types are covered. Furane Plastics, Inc. (Los Angeles).

• **Isocyanates:** Separate brochures outline physical properties and potential applications of *n*-butylisocyanate and a polyaryl polyisocyanate. The former is suggested as an intermediate for substituted ureas and urethanes production and textile waterproofing. The latter is suggested as a bonding agent for coatings and adhesives and for foam and resin manufacture. Carwin Co. (New Haven, Conn.).

• **Engine antifreeze:** 52-p. book describes standards for engine antifreeze. Sampling, freezing point, physical and chemical test methods are included. \$1.50, American Society for Testing Materials (Philadelphia).

• **Phosphating:** Detailed folder offers general discussion of phosphating; covers uses of phosphate coatings as bonds for organic finishes, as anti-friction, anticorrosion coatings. Includes phosphating reference chart for company's products. Turco Products, Inc. (Los Angeles).

• **Bondable fluorocarbons:** Three brochures describe fluorocarbons that can be treated to become bondable, bondability treatment, nature of surfaces, most common problems. Dixon Corp. (Bristol, R.I.).

• **Lab equipment:** 12-p. booklet lists chromatogram attachments, vacuum pumps, centrifuges, laboratory furniture, induction furnaces as well as other current apparatus. Harshaw Scientific Division of Harshaw Chemical (Cleveland).



C. E. Kaufman (left), Product Development Manager, Calgon, Inc., discusses the properties of the Pluronics with Ralph N. Thompson, Research Manager.

"Pluronics offer a combination of properties not available in any other single surfactant"

—Ralph N. Thompson, Research Manager, Calgon, Inc.

"We manufacture products for treating water from source to disposal," relates Calgon's Research Manager Ralph N. Thompson.

"In our various research activities, we have been, and are now, thoroughly evaluating the Pluronics—Wyandotte's unique series of surface-active agents.

"We have established that the Pluronics have a relationship . . . one grade to another. Consequently, by evaluating the different grades, we've found that combinations of properties can be obtained with Pluronics which are not obtainable in any other single surfactant by itself.

"To date, two of the properties

of the Pluronics have been sufficiently unique to enable us to develop one completely new product, as well as to revitalize and improve one of our present important products."

Perhaps *your* products can be improved using a Pluronic.* We at Wyandotte have recently compiled a new "Pluronic Grid," whereon the property trends of the Pluronics are plotted.

By studying these trends, the formulator may select those Pluronic grades with the best balance of properties for his application . . . eliminating random testing, saving valuable research time. This organized approach does not, how-

ever, eliminate the need for evaluation of the Pluronics in your own laboratories. Write today for samples and your free "Pluronic Grid." *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in principal cities.*

*REG. U.S. PAT. OFF.

Wyandotte

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**MICHIGAN ALKALI DIVISION
HEADQUARTERS FOR ALKALIES**

Soda Ash • Caustic Soda • Bicarbonate of Soda • Chlorine
Muratic Acid • Calcium Carbonate • Calcium Chloride
Glycols • Chlorinated Solvents • Synthetic Detergents
Other Organic and Inorganic Chemicals

EMPLOYMENT OPPORTUNITIES

IN THE CHEMICAL PROCESSING INDUSTRIES

- **Displayed Rate**—\$19.50 per inch. Contract rates on request. Advertising inch measures $\frac{7}{8}$ inch vertically on one column. Subject to Agency Commission. 3 columns to a page.
- **Closing Date**—Each Tuesday, 11 days prior to publication date.



- **Undisplayed Rate**—\$1.80 a line, minimum 3 lines. To figure advance payment, count 5 average words as a line. 10% discount if full payment made in advance for 4 consecutive insertions. Position wanted ads $\frac{1}{2}$ above rate.
- **Box Numbers** count as one additional line.

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High level opportunities with leading multi-plant chemical manufacturing firm in New York metropolitan area.

MARKET RESEARCH SPECIALIST—Heavy Chemical Industry

Education: BS degree in chemistry or chemical engineering.

Experience: 10-12 years industrial experience, 5 years of which in market research, market development, technical sales, or technical service in heavy chemical industry. At least 5 years specialized experience in resins and plastics in activities specified above; or in technical knowledge of plastic properties, manufacture, and use, including costs and economics, considered essential.

Salary: Open.

INDUSTRIAL SALES ACCOUNT MANAGER

Education: BS degree in chemistry, graduate specialization in inorganic preferred.

Experience: 10-15 years industrial experience with a minimum of 5 years experience in sales to heavy chemical industry and 3-5 years in direct supervisory or staff work in heavy chemical sales activities. Knowledge of plastic, and electronic chemical markets required.

Salary: Open.

MARKET RESEARCH ANALYST

Education: BS degree in scientific field.

Experience: Minimum of 5-7 years commercial experience in chemical industry and market research, market development, sales or advertising, with at least 2 years in market research activities.

Salary: Open.

Send resume—include salary requirements—to Box P2968, Chemical Week, Class. Adv. Div., P.O. Box 12, New York 36, N.Y.
OUR EMPLOYEES KNOW OF THIS AD

CHEMIST

SPECIALTIES OR WAX EMULSIONS

We require a man experienced in the development of waxes, polishes, or other chemical specialties. Must be able to test against specifications. Age under 40 preferred, but "know how", initiative, and determination to grasp opportunities is the prime requisite.

We suggest you investigate this opportunity afforded by one of the most modern and up to date laboratories of its kind. Congenial environment, company paid for retirement program, and a liberal salary arrangement to the right man, make this a very worthwhile proposition.

Please phone Mr. C. W. McDermott,
Trinity 7-6200

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POLYETHYLENE SALES

Spencer seeks a man with enthusiasm, drive and a desire for future progress for a position as Polyethylene Sales Representative.

Plastics processing experience is desirable but not necessary. Sales experience is also desirable. Location would be East Coast or Mid-West.

Excellent opportunities for future advancement exist in a rapidly expanding organization where annual sales have reached 45 million dollars in its short ten year life.

Please send résumé of your experience to:

Field Sales Manager
Industrial & Plastics Products
Spencer Chemical Company
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Kansas City, Mo.

chemical engineers

FOR PROCESS ENGINEERING

Chemical Process Engineering group of synthetic fiber division has exceptional opportunity for Chemical Engineers with BS, MS or PhD and 5 to 10 years experience in economic evaluation, process development, production or process engineering. The duties involve working with high level staff on development and production problems including process design, process improvement and economic evaluation.

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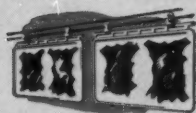
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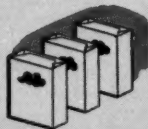
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Lithium					
Lithium Hydroxy					
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Magnesium					
Sodium					
Cadmium					
Zinc					
% Metal					
Color					
Clarity					
Acid No.					
Sp gr.					
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